RAILROAD GAZETTE

FRIDAY, SEPT. 18.

CONTENTS.

ILLUSTRATIONS:	PAGE.
The New York Central Fast Passenger Engine	645
Profile of the New York Divi- of the Philadelphia & Read- ing	646
The Standard Gauge for the M. C. B. Coupler	646
The Heath Rail Joint	649
The Cedar Avenue Bridge—Baltimore, Md.	649
Harvey Steel Stock Car	650
Pneumatic Apparatus for Mov- ing Slack Coal	656
CONTRIBUTIONS:	
Steel Car Details	645
Cylinder Volumes for Com- pound Locomotives	645
Dimensions for Low Pressure Cylinders	645
EDITORIALS:	
The New Gauge for Vertical Plane Couplers	652
Minneapolis vs. Duluth	652
Cylinder Volumes for Com- pound Locomotives	653
Aerodromics	653
Railroading in New South Wales	654
EDITORIAL NOTES	652, 654
NEW PUBLICATIONS	655

GENERAL NEWS:	PAGE.
Locomotive Building	658
Car Building	658
Bridge Building	658
Meetings and Announcements	659
Personal	660
Elections and Appointments	660
Railroad Construction	660
General Railroad News	662
Traffic	662
MISCELLANEOUS:	
Technical	656
The Scrap Heap	657
Railroad Law	658
The Latest Long Fast Distance Run	645
Ninety Miles an Hour	645
The Fast Trip from Yoko- homa to Queenstown	646
Roadmasters' Association of America—Minneapolis Con- vention	647
The Threadless Screw Street Railroad	649
Natural Gas	649
General Passenger Agents' Convention	650
Shop Notes—C., B. & Q.	650
Harlem River Drawbridges	650
Moving Slack Coal by Blow- ing	656
Street Railroads in Holland	656

Contributions.

Steel Car Details.

CHICAGO, Sept. 14, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your recent editorial note regarding the use of metal centre sills in freight cars, the idea is suggested of using two large channels, say 12 in. deep, extending the entire length of the car, the draft attachments being made directly thereto by placing the drawgear between the two channels, thus obviating the use of wooden draft timbers. If you will refer to your paper of June 5, 1891, page 386, you will notice an article with regard to the Harvey steel box car with drawings. The details therein show this deep centre sill with the drawgear attachments placed between the two metal members in exactly the same form proposed in the note. We have been using this construction for some time past in our steel cars. This design we find is most advantageous, as there is no such thing as pulling out draft sills in our cars. Pulling and buffing strains are directly transferred through these centre sills, forming a complete continuous drawgear. The deep sill at the same time prevents the cars from bending down over the bolster or "hogging up," which is of common occurrence in wooden car construction.

THE HARVEY STEEL CAR CO.

Cylinder Volumes for Compound Locomotives.

Schenectady Locomotive Works,
SCHENECTADY, N. Y. Sept. 15, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am obliged to you for the opportunity to see a proof of your editorial under the above title. I can only reply very hastily, as I am just leaving home for the rest of the week. There is an extreme in both sides of the compound question. Judging from what I saw while in England and Scotland two years since, I think the compound engines are over cylindered, as they all slipped badly in starting the trains, and with those having a single pair of drivers they could not be worked up to a good cylinder power in ascending grades without slipping, and, as a consequence, lost time or lagged in speed to a very noticable degree on up grades. Our first compound (Michigan Central) slips its drivers very readily and has made a better record on heavy grades, using 180 lbs. of steam, than the simple engines having 19 in. × 24 in. cylinders and 165 lbs. steam, and same weight on drivers.

One of the good results of the two cylinder compound is saving of condensation by maintaining in two separate cylinders a varying temperature of, say, 75 degrees, the H. P. cylinder, of course, being at a higher temperature than the L. P., instead of admitting H. P. steam into one cylinder with 150 degrees variation of temperature. The question arises as to how much the L. P. cylinder can be increased without too much condensation, due to undue expansion. From the fact that our compound engines are showing an average of 20 per cent. economy over similar simple engines, we are inclined to believe the cylinders are not badly proportioned for the various types built, though, possibly, the L. P. cylinder might be increased somewhat with beneficial results. We believe that none of the foreign compounds are showing better economy than above stated.

A. J. PITKIN, *Superintendent.*

Diameter of Low Pressure Cylinders.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to Mr. F. W. Dean's reply to my communication on two-cylinder compound locomotives, I would say that my communication in his case brought out exactly what I hoped to bring out, and that is that there must be large low pressure cylinders on compound locomotives, and that the total power of the engine depends upon the total low pressure cylinder capacity; but I notice that he does not solve the problem of location of such cylinders on two-cylinder compounds, but falls back on the Lepage patents, which contemplate three cylinders. The point which Mr. Vauclain has made is that with a two-cylinder compound it is next to impossible to put a sufficiently large low pressure cylinder on the ordinary locomotive, and this is a point which I would like to see discussed.

Mr. Dean's statement regarding the cut-off in the low pressure cylinder is, as I take it, a general statement. It could hardly be true that the cut-off in the low pressure cylinder for a two-cylinder compound should be the fraction of the stroke represented by the reciprocal of the ratio of the cylinders, "and so on, no matter where the high pressure point of cut-off is," for the reason that with the two-cylinder compound engines as now built there would be a decided lack of ultimate hauling capacity. An examination of the moment of rotation determined from the actual indicator cards taken from two-cylinder compounds proves this to be the case. Almost invariably two-cylinder compounds are being run at a long cut-off at starting.

Undoubtedly Mr. Dean is right in stating that the compound locomotive needs independent exhaust valves more than the simple engine; and it may be that if the compound locomotive is as economical as it is now claimed to be, there will be sufficient advantage from its use to induce railroad men to put up with the additional complication of a valve gear having independent exhaust valves.

TWO CYLINDERS.

The Latest Fast Long Distance Run.

Last Monday a train on the New York Central & Hudson River Railroad was run from New York City to East Buffalo, 436⅓ miles, in 439½ min., beating all previous records for sustained speed at long distances. This was the inclusive speed. The stops to be deducted were: Albany, 3 min. 28 sec., changing engines; Syracuse, 2 min. 58 sec., changing engines; Fairport, 7 min. 50 sec., hot journal. No allowance is made for slackening speed to take water. The actual running time was thus 425 min. 14 sec. The average speed including stops was 59.56 miles an hour; excluding stops it was 61.56 miles an hour.

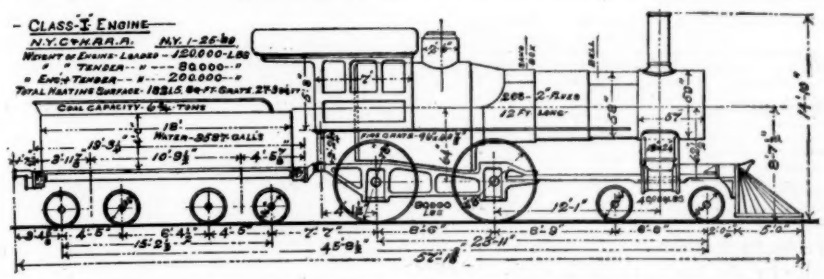
The run from New York to Albany, 142.88 miles, was made without a stop in 140 minutes, or at the rate of 61.23 miles an hour. From Albany to Syracuse, 147.84 miles were run in 146 minutes, or at the rate of 60.75 miles an hour. From Syracuse to Fairport, 70 43 miles, the time was 67.81 minutes, or 62.28 miles an hour; and from Fairport to East Buffalo, 75.17 miles, the time was 71.91 minutes, or 62.70 miles an hour. It will be noticed that the speed was remarkably uniform in the four divisions of the run. A more detailed analysis of the schedule will show the same essential uniformity of speed. The fastest single mile is said to have been made in 47 seconds, and this was done twice, once on the Mohawk and once on the Buffalo divisions. This is at the rate of 76.59 miles an hour. For these figures and for the following schedule we are indebted to an admirable report in the New York *Sun*.

The train weighed about 230 tons, as follows: Three cars, 259,600 lbs., say 130 tons; locomotive, 60 tons; tender, with load, 40 tons; total, 230 tons. The weights and dimensions of engine 870 with which the train started are given on the diagram herewith. The other two locomotives are similar except that they have 69-in. drivers instead of 78 in. The total heating surface is 1,821.5 sq. ft., and the grate area is 27.3 sq. ft.

The original intention in arranging this remarkable run was to make the whole distance of 436 miles in 436 minutes, including stops. This would easily have been done but for a hot journal on the locomotive, which caused the extra stop of 7 min. 50 sec. at Fairport. The train reached that place, 361.15 miles from New York, in 360.25 minutes elapsed time, or slightly ahead of the schedule.

Of course comparisons will be made between this and previous long distance records. We give below in a table this New York Central & Hudson River run, the run of September 2, over the Rome, Watertown & Ogdensburgh and the New York Central with the Japan mail and two of the celebrated runs made by the Scotch expresses in the race of 1888. The details of the Japan mail run are given in another article in this issue. It will be seen that the run from Morristown to New York was better than that of the "West Coast" run to Edinburgh, while 95 miles was made in 90 minutes or at the rate of 63.3 miles an hour. The Scotch runs were made regularly for some days at the lower rate given in the table; but we believe the greater speed was only reached once, on the last day of August, when the racing ceased. In fact the real contest was only kept up from Aug. 6 to Aug. 13. The New York Central run of June last is notable by reason of the much greater weight of the train than in any of the other cases.

STATIONS.	Miles from New York.	Distance between points.	Time of arrival.	Time between stations.
New York:			A. M.	m. sec.
Grand Cen. Station		0.00	7:30:15	0:00
138th street	4.95		38:00	
Spuyten Duyvil	11.15		45:29	
Yonkers	15.22		50:15	
Peekskill	41.29		8:15:16	
Fishkill	58.98		31:50	
Poughkeepsie	73.48		44:45	
Rhinecliff	89.08		59:55	
Tivoli	99.01		9:08:18	
Linlithgo	108.30		16:20	
Hudson	114.45		22:48	
Castleton	134.29		41:26	
Albany, arrive	142.88	142.88	9:50:15	140:00
" leave		0.00	53:13	3:28
Schenectady	159.88		10:14:40	
Palatine B.	197.79		50:49	
Little Falls	216.42		11:09:05	
Herkimer	223.53		15:58	
Ilion	226.01		18:13	
Utica	237.55		28:56	
			P. M.	
Syracuse, arrive	290.72	147.84	12:19:43	146:00
Syracuse, leave			12:22:41	2:58
Fairport, arrive	361.15	70.43	1:30:30	67:49
Fairport, leave			1:38.20	7:50
Rochester	371.10		49:44	
Byron	395.89		2:14:33	
Batavia	403.44		22:30	
Corfu	414.81		32:58	
Crittenden	419.17		36:48	
Wende	422.16		39:35	
Looneyville	423.96		41:40	
Grimesville	428.85		46:00	
Forks	433.07		49:24	
East Buffalo	436 32	75.17	2:50:15	71:55
Buffalo	439 58	3.26	2:58:15	8:00


CLASS-T ENGINE
N.Y.C.&H.R.R.R. NY. 1-26-90
WEIGHT OF ENGINE LOADED - 120000 LBS
" " TENDER " " - 80000 "
" ENGINE TIMBER " " - 200000 "
TOTAL HEATING SURFACE - 1821.5 SQ. FT. GRATE 27.3 SQ. FT.
COAL CAPACITY - 6½ TONS
WATER - 2587 GALLS
FIRE GRATE - 96.2 SQ. FT.
2 FLUES 12 FT. LONG
SMOKE BOX
45'-9½"
52'-11"

Date.	Railroad.	Terminals.	Distance. miles.	Inclusive. Time. H. M.	Inclusive. Speed.	Stops. No.	In motion, Time. H. M.	In motion, Speed.	Weight. lbs.
Sept. 14, '91..	New York Central & Hudson River.	New York--East Buffalo.	436.32	7 19.5	59.56	3	7 5.25	61.56	459,600
Sept. 2, '91..	R. W. & O. and N. Y. C. & H. R.	Morristown—New York..	360.95	6 58	51.81	6	6 27	55.96	206,000 and 284,300
Aug., '88....	London & N'west'n and Caledonian.	London—Edinburgh	400	7 52	50.9	3	7 13	55.4	348,000
Aug. 31, '88..	Gt. Northern and Northeastern	" "	392.5	7 27	52.7	5	6 47	57.8	
July, '85....	West Shore	New York—East Buffalo.	422.6	9 23	45.0	12	8 17	51.0	511,000
June 22, '91..	N. Y. C. & H. R.	New York—Buffalo	439.52	8 58	49.02	5	8 34	51.31	*717,000

* For the last 119 miles the weight was only 317¼ tons.

Ninety Miles an Hour.

The fast run on the Philadelphia & Reading, briefly noticed in the *Railroad Gazette* of Sept. 4, seems to deserve all the praise it has received, and we therefore print below a detailed schedule of the trip, with a profile of the road. The speed for five miles was the fastest of which we can find any authentic record for any distance. In fact, few, if any, of the records that have been published have been made in the manner pursued in this case. The time here was taken by careful observers, reading from a "fifth-second chronograph," at every mile post. As our readers know, this division of the Reading is noted for its high speed, the New York and Philadelphia trains running over it having been, we believe, the first in America to be regularly scheduled at speeds requiring more than a mile a minute to be run every day (on some parts of the road) with four-car trains. Very high records on this road have been published in the newspapers on several occasions during the past ten years, notably one in 1889 (a mile in 40 seconds, by this same engine and runner), when the regular locomotives were being tried in comparison with the Strong engine; but this of August 27 is the first of which we have been able to get an official record showing higher than 82 miles an hour.* Seventy-eight

* Six miles in four minutes (90 miles an hour) has been claimed on trains on the Baltimore & Ohio, New York Central, and other roads, and it is doubtless a fact that this rate has been made on several occasions: but, in every case that we have been able to investigate, the statements lacked accuracy; distances were assumed at stations in even miles, and the minutes were stated in a way suggestive of "round numbers." The numerous fast runs made between London and Edinburgh in 1888 doubtless included a number of the best "spurts" ever made, but we find among the records very few references to the maximum speeds attained for short distances. The highest rate named in the accounts printed at the time by *The Engineer* and *Engineering* is 76.6 miles an hour for four miles.

miles an hour for ten miles on a stretch, with four cars, is a common speed on this division of the Reading, and has been for the last nine years. The grade all the way to Bound Brook is undulating, as in the profile we print to-day.

The special train of Aug. 27 was run by President A. A. McLeod, of the Reading road, to satisfy an incredulous friend who doubted the possibility of running a locomotive faster than 75 miles an hour.

It started from the station at Ninth and Green streets, Philadelphia, at 1:30 P. M., there being on board several officers of the road, besides a number of invited guests. The weight of engine and train was about 169 tons, as follows:

	Pounds.
Engine	98,000
Tender	68,300
Car 366	42,900
Car 658	57,200
Car "Reading"	70,850
Total	337,250

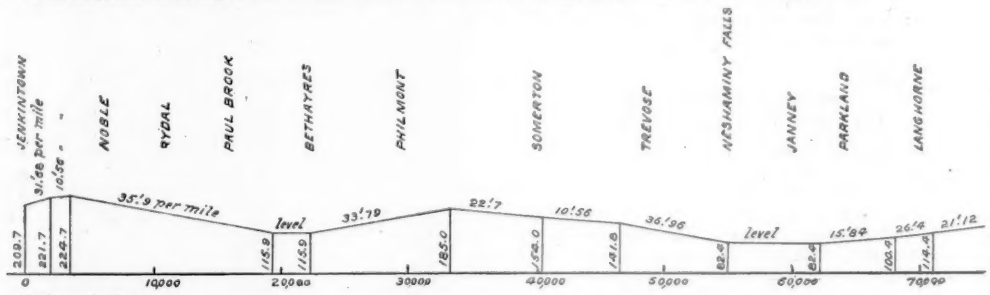
The engine, No. 206, built in 1886, is a class D 33, with a Wootten firebox, burning hard coal; cylinders 18½ × 22 in.; four driving wheels 68 in. in diameter. The men in charge of the train were: Engineer, John Hogan; fireman, Oscar Teschner; conductor, W. S. Morgan; brakemen, J. B. Kindig and T. A. Crowell.

Following is a transcript of the official record of that portion of the run where the fast time was made, which, as will be seen by the profile, was between Jenkintown and the Delaware River:

No. of mile.	Time at mile post.	Seconds per mile.	Miles per hour.
0			
1 (Noble)	0.45	45	80.0
2	1.27⅗	42⅗	84.5
3	2.12⅕	44⅗	80.7
4 (Bethayres)	2.59⅖	47⅕	76.2
5	3.45⅖	46⅕	77.9
6	4.28⅕	42⅗	84.5
7 (Somerton)	5.10⅗	42⅖	84.9
8	5.52⅗	42	85.7
9	6.32⅗	40	90.0
10 (Neshaminy)	7.12⅖	39⅘	90.5
11	8.00⅕	47⅘	75.3
12 (Langhorne)	8.42⅕	42	85.7
Total miles, 12; time, 8 min. 42⅕ sec.		522⅕	Av. 82.7

Average for the 6th to the 10th miles, inclusive 87 miles an hour.

This train arrived at Ninth and Green streets on the return at 3:26 p. m., and the engine and cars were attached to train No. 524, leaving at 4:00 p.m. for Jersey City, which point was reached on schedule time (5:22). It will be seen that the fastest mile was made on level immediately following a descending grade of 37 ft. per mile.



Distance in feet.

Profile of the New York Division of the Philadelphia & Reading—Jenkintown to Langhorne.

The Fast Trip from Yokohama to Queenstown.

As was announced last week, the extraordinary trip of the special mail train from Vancouver to Brockville over the Canadian Pacific, and from Morristown to New York over the Rome, Watertown & Ogdensburg and New York Central & Hudson River roads, noticed in the *Railroad Gazette* of Sept. 4, was supplemented by an equally creditable ocean voyage, and the best previous record between Japan and England reduced by several days. The railroad portion of this journey is of special interest simply from the length of the continuous trip, and the average speed for the whole distance, not to mention the high speeds made on portions of the road, although these are noteworthy; and we therefore print herewith the official schedules for the whole distance.

The steamship "Empress of Japan" left Yokohama, Japan, Aug. 19, at 8:45 a. m., arrived at Royal Roads, off Victoria, Aug. 29, 4:24 a. m. She reached Vancouver about noon, Aug. 29, and a special train, consisting of a mail and baggage car and one sleeper, with 33 bags of mail from China and Japan, left Vancouver at 13:08 o'clock, and ran as below:

THE RUN ON THE CANADIAN PACIFIC.

	Miles.	
Left Vancouver		13:08 Pacific time, Aug. 29.
Arr. North Bend	129	16:20
Dep. "		16:30
Arr. Kamloops	121	19:55
Dep. "		20:00
Arr. Revelstoke	128	23:55
Dep. "		24:25 Aug. 30.
Arr. Donald	80	3:15 Time, 14 h. 07 m., 458 miles = 32.4 miles an hour.
Dep. Donald		4:25 Mountain time.
Arr. Canmore	116	7:58
Dep. "		8:11
Arr. Gleichen	122	10:47
Dep. "		10:52
Arr. Medicine Hat	125	13:23
Dep. "		13:43
Arr. Swift Current	149	17:53 Detained 1 h. 20 m., hot box.
Arr. Moose Jaw	112	21:27
Dep. "		21:43 New brasses.
Arr. Broadview	125	1:15 Aug. 31.
Dep. "		1:23
Arr. Brandon	131	4:30 Time, 24 h. 05 m., 880 miles = 36.5 miles an hour.
Dep. Brandon		5:44 Central time.
Arr. Winnipeg	133	8:42
Dep. "		9:00
Arr. Rat Portage	133	13:06
Dep. "		13:15
Arr Ignace	145	16:58 Hot box on sleeper.
Dep. "		17:05
Arr. Fort William	148	21:15 Hot box on sleeper.
Dep. "		21:30
Arr. Port Arthur	4	21:38 Time, 15 h. 54 m., 563 miles = 35.4 miles an hour.
Dep. Port Arthur		10:44 p. m., Eastern time,
Arr. Schreiber	128	2:02 a. m., Sept. 1.
Dep. "		2:10
Arr. White River	119	5:31
Dep. "		5:37
Arr. Chapleau	131	8:41
Dep. "		8:48
Arr. Cartier	137	12:05 p. m.
Dep. "		12:10
Arr. North Bay	115	2:50
Dep. "		3:00
Arr. Chalk River	118	6:03
Dep. "		6:18
Arr. Charleton Jct.	98	8:18
Arr. Brockville	45	9:09 Time, 22 h. 25 m., 891 miles = 39.7 miles an hour.

Vancouver to Brockville, 2,792 miles, 76 h. 31 m. actual time (36.49 miles an hour); apparent time, 79 h. 31 m.

Dep. Brockville	(Ferry)	9:15 p. m.
Arr. Morristown	"	9:43

R., W. & O. AND N. Y. C. & H. R.

Stations.	Arrived.	Departed.	Detentions.
MORRISTOWN	....	9:45 p. m.	Sept. 1.
Theresa Junction	....	10:19	
Philadelphia	....	10:27	
Carthage	10:42	10:45	Taking on oiler.
Glendale	11:15	11:18	3 min. for water and oiling.
Boonville	....	11:37	
Trenton Falls	....	11:58	
Trenton	....	12:00	
Holland Patent	....	12:04 a. m.	Sept. 2.
UTICA	12:18	12:22	4 min. changing engines.
(N. Y. C. & H. R.):			
Herkimer	....	12:35	
Palatine Bridge	....	12:57	
Fonda	....	1:08	
Tribes Hill	....	1:14	
Amsterdam	....	1:18	
Schenectady	....	1:32	
ALBANY	1:52	2:02	Changing engines. Orders.
Hudson	....	2:35	
Barrytown	....	3:05	10 min. delay by train No. 32.
Poughkeepsie	....	3:24	
Fishkill	....	3:38	
Cold Spring	3:44	3:49	Taking water.
Spuyten Duyvil	....	4:27	
Mott Haven Junction	....	4:34	
GRAND CEN RAL STATION	....	4:43	Sept. 2.

Distance.	Time.	Time, excl. stops.
Morristown to Utica. 123.40	2 h. 33 m.	2 h. 31 m.
Utica to Albany 94.67	1 h. 34 m.	1 h. 30 m.
Albany to New York 142.88	2 h. 51 m.	2 h. 26 m.
Total 360.95	6 h. 58 m.	6 h. 27 m.

From Morristown to New York the time, including delays, was 6 h. 58 m., and the rate 51.81 miles per hour. The time, exclusive of delays, was 6 h. 27 min., and the rate 55.96 miles an hour. In computing the time "exclusive of delays" no allowance has been made for slackening speed over bridges being repaired on the Rome, Watertown & Ogdensburg; through Schenectady; down West Albany grade, and for scooping water at Palatine Bridge.

Make-up of Train.	Weight, lbs.
MORRISTOWN TO UTICA:	
Engine No. 70, cylinders 17 × 21	123,600
Baggage car	38,000
Coach	45,000
Total	206,000
UTICA TO ALBANY (95 miles in 90 minutes):	
Engine No. 876, cylinders 19 × 24	121,000
Tender	80,000
Baggage car	38,000
Coach	45,000
Total	284,000

ALBANY TO NEW YORK. Same as preceding division, except that the engine was No. 870, same class as 876.

The mails were delivered on board the steamship "City of New York," of the Inman Line, at 5:10 a. m., Sept. 2. Steamer sailed at 6:30 a. m. Reported passed Sandy Hook 9:15 a. m. Arrived Queenstown 2 p. m., Sept. 8; arrived London 10 a. m., Sept. 9. Owing to a blunder of the post-office officials at Queenstown, certain bags that should have been taken off at Queenstown and sent thence by rail, were taken to Liverpool, and 12 hours was thus lost.

SUMMARY.

	Days.	Hours.	Mins.
Yokohoma to Royal Roads	9	19	39
" to New York	13	30	..
" to Queenstown	20	5	15
" to London	Under 21 days.		

The Standard Gauge for the M. C. B. Coupler.

The announcement of the Executive Committee in relation to gauges and limits for the standard M. C. B. automatic coupler is as follows:

The committee has carefully reconsidered the whole question since the discussion on its report to the convention in June, and in view of this discussion and the action of the convention upon its report, the committee believes that it is the desire of the association to have it act under the instructions of the convention of 1890, and to make arrangements whereby all parties interested may be able to procure sets of gauges so that all sets will

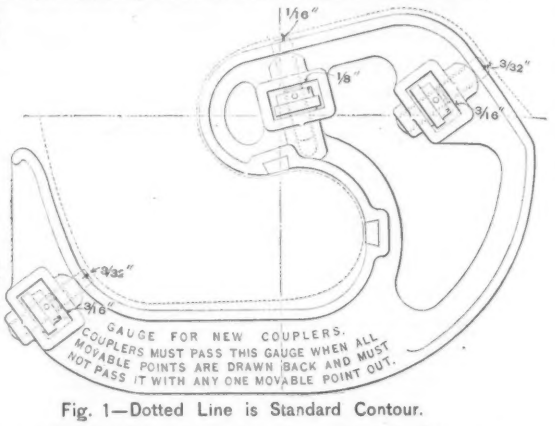

1/16"
1/8"
3/32"
3/16"
3/32"
3/16"
GAUGE FOR NEW COUPLERS.
COUPLERS MUST PASS THIS GAUGE WHEN ALL MOVABLE POINTS ARE DRAWN BACK AND MUST NOT PASS IT WITH ANY ONE MOVABLE POINT OUT.

Fig. 1—Dotted Line is Standard Contour.

be alike, which can be used to determine whether any and all new couplers of this type are near enough to the standard contour established by the association to insure proper coupling with one another, in so far as it can be insured by close adherence to the standard contour, and also to establish limits of variation for such of the standard rectilinear measurements of the coupler, only, as will promote the interchangeability of couplers in place upon cars. The committee therefore announces the gauges shown in figs. 1 and 2 for the contour line, and thickness of knuckle, respectively, with the limits of variation allowed by these gauges, and it also announces the limits for the standard rectilinear measurements, as given in the table with fig. 3.

The gauge for new couplers shown in fig. 1 is announced in lieu of the gauge proposed in the committee's report to the association, because it provides means for gauging the contour lines, excepting the thickness of the knuckle, at points throughout the whole essential extent of the standard form of contour, and it controls the variation in both directions from the standard; whereas

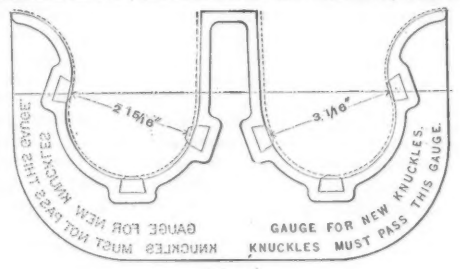


Fig. 2.

Coupler Gauges.

the gauge proposed in the report was only a minimum gauge for a portion of the standard contour, and its use would involve numerous measurements at different heights for the maximum variation, instead of gauging for both limits. The figures shown for the variation allowed with this gauge on fig. 1 are the same as those recommended in the report at the same points, and the additional point in the back of the knuckle is allowed to vary the same as was recommended at the guard arm.

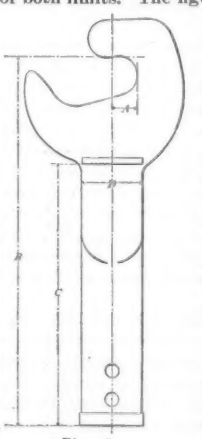


Fig. 3.

The gauge for new knuckles, shown in fig. 2, is announced as a proper gauge for knuckles, allowing $\frac{1}{16}$ in. variation each way from the standard dimensions of 3 in., instead of $\frac{1}{16}$ in. one way only, as recommended in the report, because it is thought desirable to allow more than $\frac{1}{16}$ in. variation on account partly of the necessary taper in cast knuckles.

The limits shown in table with fig. 3 are announced as proper limits of variation for the standard rectilinear measurements, which are the same as the limits recommended in the report, except that the standard distance *A* of 2 in. is included herein with an allowable variation of $\frac{1}{16}$ in. each way, and the cross section *D* is allowed to vary $\frac{1}{16}$ in. each way from the standard measurement of 5 in., instead of only $\frac{1}{16}$ in. one way, as recommended in the report. The Executive Committee considers it inexpedient to announce limits of variation for dimensions which are not standard, but which were mentioned in the report, because the convention ordered that a committee be appointed to report next June on any new standard measurements and limits which may be desirable in connection with the coupler. It is also considered undesirable to provide any specific measuring instrument for the limits of rectilinear measurement given in table with fig. 3, as these distances may be measured in numerous ways by whatever means are best available.

	Std.	Max.	Min.
A	2 in.	2 1/16 in.	1 15/16 in.
B	30 "	30 1/16 "	29 15/16 "
C	21 1/4 "	21 5/16 "	21 3/16 "
D	5 in. sq.	5 1/16 "	4 15/16 "

The Executive Committee has made arrangements with the Pratt & Whitney Co., of Hartford, Conn., to furnish gauges as shown in figs. 1 and 2, so

that every set furnished will be like every other set and proved by master gauges provided and held by the Pratt & Whitney Co. for that purpose, a duplicate set of which master gauges will be filed in the office of the Secretary of the association for use in settling any questions in dispute about the accuracy of gauges. The frames of the gauges will be made of the best quality of gray iron, with plain lettering, as shown on the cuts, and the gauging points will be of hardened tool steel.

Roadmasters' Association of America—Minneapolis Convention.

We gave last week a brief report of the proceedings of this convention up to Wednesday night. We continue the current report and give abstracts of the various reports of committees and papers.

Mr. H. W. Reed presented a paper on the Preservation of Ties, which was read at the opening of the session. It was voted that the subject of treating ties be brought up at the next year's meeting and that all members look up the matter, and that some be appointed to prepare reports and papers on the cost of treatment and the lengthening of the life of the tie, due to the various methods of preservation. And that samples of treated ties which had been in track a number of years be procured and brought to the meeting.

Mr. Black (Manhattan Elevated) made the report on Interlocking Devices.

Mr. R. Caffrey's committee report on the Chemical Composition, Section and Weight of Steel Rails was not prepared, and the matter was referred back to the Executive Committee, as was a committee report on the Advantages of Broken and Square Joints.

The Committee on Association Badge presented several designs. The one adopted by the convention was a small disk having a narrow rim, with a frog in relief across the face, the design to be made in bronze.

A committee of nine was appointed to formulate certain amendments to the constitution and by-laws as follows: J. W. Craig, C. E. Jones, I. Burnett, J. A. Kerwin, John Doyle, W. H. Stearns, B. Murtaugh, J. B. Moll, G. W. Bishop.

The convention next proceeded to the election of officers for the ensuing year as follows: *President*, John Doyle, Detroit, Lansing & Northern; *First Vice-President*, W. H. Stearns, Chicago & Northwestern; *Second-Vice-President*, J. B. Moll, Chicago, Milwaukee & St. Paul; *Secretary and Treasurer*, J. H. K. Burgwin, Grand Rapids & Indiana. Mr. O. E. Jordan, Michigan Central, was elected a member of the Executive Committee, vice Black, term expired.

A letter from the Mayor of Atlanta, Georgia, was read inviting the association to hold its next annual meeting in that city, and offering a most cordial welcome on behalf of the city to them at that time. It was voted that this invitation be accepted. The convention then voted to open the annual meeting of 1892 at Chattanooga, Oct. 18, and to continue the same to Atlanta on the 19th, the Committee of Arrangements to be as follows:

J. W. Craig (C. & S.), H. W. Reed (S. F. & W.), B. M. Burroughs (F. C. & P.), Ward (S. C.), A. N. Freeland (W. C. A. C.), D. McCarthey (J. T. & K. W.)

A committee offered resolutions thanking the Northwestern Track & Bridge Association, the Mayor and citizens of Minneapolis, the Exposition, street car and State Fair managements, also the several railroads centring here, for the many courtesies extended to the association. After which the convention adjourned to Oct. 18, 1892, at Chattanooga.

Friday a number of the members took a trip to Duluth by invitation from the general managers, going via the St. P. & D., and returning Saturday via the Great Northern.

Before the Wednesday morning meeting the association inspected two rotary snow plows which had been conveniently placed by Mr. Leslie. These illustrated the old and new designs of the rotary and as they had steam up, the party was enabled to see clearly their working mechanism, there being nothing lacking except a good sized snow bank.

The papers and reports follow:

PRESIDENT DOYLE'S ADDRESS.

. . . Competition and the public demand cheap transportation. With strong granger legislation against the railroads good management has been necessary to prevent business being done at a loss. In my opinion every man employed by a railroad should post himself as to its financial standing, and vote against men who will try to pass laws in the state legislatures or halls of Congress to pauperize the road that employs him. Don't vote for a man regardless of his politics who will take the very bread from the mouths of your wives and children. What does strong granger legislation mean? What do low freight and low passenger earnings mean? They all mean starvation prices to the 725,000 railroad employés in this country, one-fourth of which number are employed in the track department of our railroads under the jurisdiction of the roadmasters. Put it down. The legislatures have but one object in view, viz., to pass laws to help the farmers at the expense of the railroad employés. Can it be possible that 18 per cent. of the railroad employés of the Northwest are out of work on account of the stringent legislation of the past few years? Yet such is the case, and no railroad man should be caught napping. God forbid that we should bring politics into this convention; but the day is not far distant when the railroad men will have to rise up in their might and vote as one man to protect their interests at the ballot box. . . .

The granger don't care whether the railroads earn any money or not, nor whether the employés are paid wages upon which they can live the year around, and it is perfectly evident that the railroad companies cannot pay their employés money, which they, the railroads, don't earn. No one else is coming forward to protect the interests of the employés unless they do it themselves, and there is nothing left for railroad employés but to use the weapon given them by our forefathers when they framed the constitution of this great nation. . . .

PRESERVATION OF CROSS TIES.

Less than two months ago I was honored by an invitation to again address this association on the same subject (Preservation of Cross Ties) at this convention. I regret that the notice was too short to enable me to obtain the information necessary for a more thorough analysis of the various preservative processes and the results of their application, than was presented in my first paper. I will, however, restrict myself as far as possible to the branches of the subject in advance of or outside of the matter contained in that report.

There are annually consumed over 73,000,000 crossties on the railroads of the United States. The present rate of consumption of crossties is double the rate of possible production of the present timber areas. Aside from this, large numbers of crossties are annually exported to Central and South American points. An annual expenditure of over $30,000,000 should stimulate our best energies toward the adoption of methods that will prolong the life of ties.

As shown in my former report, the process of creosoting undoubtedly accomplishes that end, but the expense of the process is so great that very few railroads care to undertake it.

In my last report I called attention to the process of vulcanizing, as used on the Manhattan Elevated, and the Well-House zinc-tannin process, as used on the Atchison, Topeka & Santa Fe. Both of these processes were and still are tentative, and it will require several years' experiment to determine their value, though it is said that the latter process has practically doubled the life of crossties. The A. T. & S. F. have dropped the tannin and glue, and are using solely the zinc chloride. I regret that I have not been able to obtain the reason for this change. I note that the Delaware & Hudson Canal Co. is about to make a test of about one mile of track with ties treated with the zinc-tannin process, and one mile with the vulcanizing process. This test, if made thoroughly, will in time yield valuable results, and should be watched with interest.

There are several methods of preserving the life of ties, other than the use of chemical preservative agents or substitution of materials that come practically within the scope of a roadmaster's privilege, and which I will undertake to mention briefly:

1. *Select the most durable timber.* In reply to a circular addressed to various railroads I have the following information on the life of various woods:

Name of road.	Kind of wood.	Ordn'y life.	Remarks.
Del. & Hud. Canal Co.	White oak.....	7 to 12 years	
	and chestnut..	5 to 10 years	
B. C. R. & N.	White oak and white cedar	Average 8¾ years	
F. & P. M.....	Hemlock	5 years	
	White oak.....	8 to 9 years	Should have
	Cedar.....	8 to 10 years	tie plates.
Ala. Midland.....	Yellow pine....	5 to 6 years	
Chicago & Alton.....	Oak.....	8 years	
	Cedar.	6 years	
Penn.....	White oak	5 to 6 years	
	Rock oak.....	5 to 6 years	
L. S. & M. S.....	White oak.....	6 years	
	Cedar.....		Depends upon wear.
Lehigh Valley.....	W. and R. oak.	8 years	
	Yellow pine....	7 years	
	Cypress.....	8 years	
	Chestnut.....	8 years	
Mich. Cent.....	Oak.....	6 to 9 years	
	Hemlock.....	4 years	
	Tamarack.....	4 years	
	Cedar.....	6 to 9 years	
L. & N..	Oak.....	7 to 8 years	Further south shorter the life.
	Yellow pine ...	5 to 7 years	
B. & O.	Oak and cedar.	8 years	
C. B. & Q.....	Oak.....	8 years	
D. & R. G.....	Yellow pine...	5 years	
	Red spruce. ...	6 years	

From this table we have:

Oak	Average life....	8 years	
Black cypress,.....	" "	8 years	Cut or wear out before decaying.
Chestnut	" "	7½ years	
Red cedar.....	" "	7 years	Cut or wear
Yellow pine.....	" "	6 years	out, etc.
Red spruce.....	" "	6 years	
Hemlock....	" "	4½ years	
Tamarack.....	" "	4 years	

Thus oak is undoubtedly the wood most favorable for tie timber, and furnishes 60 per cent. of the ties used in this country. Pine furnishes 20 per cent. of our ties, cedar 6 per cent., chestnut 5 per cent., hemlock and tamarack 3 per cent., redwood 3 per cent., cypress 2 per cent., various woods 1 per cent.

There are two elements of durability in ties: 1st. Resistance to decay; 2d. Resistance to wear.

Oak combines both qualities in the highest degree. Yellow pine resists wear, but not decay. Red cedar and black cypress resist decay, but are too soft. Therefore to secure the best results from the use of cedar or cypress, a hard plate of wood, steel or iron must be placed immediately under the rail; such plates are manufactured in quantities to meet all demands and will be the means of bringing into use large quantities of black cypress crossties, of which the South has an abundant supply. These ties with suitable tie plates should last at least 12 years. The tie plates, however, should be made to cover the full width of the tie, and possess 50 per cent. more bearing surface than the base of the rail, with sufficient stiffness to prevent springing; they can thus be used repeatedly and the extra first cost be compensated for by increased service. Yellow pine is sufficiently hard to resist wear for ten or twelve years, but as it decays in six years, any process that will successfully resist decay, without adding greatly to the expense, will be valuable. Vulcanizing appears in theory to meet the requirements. Three to five cents is stated as the additional cost per tie for this process. Thus when the more costly (though perhaps more economical) method of creosoting is rejected, vulcanizing, at least with the yellow pine, may prove a valuable substitute.

2. *Give Proper Attention to the Specification for and Inspection of Ties.*—Every company has its specifications more or less rigid according to local requirements. These vary from 6 to 8 inches in thickness, 7 to 12 inches in width, and 8 to 9 feet in length, for standard gauge roads. Specifications generally require a certain width of heart, freedom from wind shakes, rots, hollows, splits, etc.; also require that faces shall be smooth, free from bark, etc. It is customary to allow slight variations from the specifications as to dimensions, as some will run over and others under the exact requirements. Thus tie contractors take advantage of this variation as far as they can, and the inspector must exercise great firmness, as well as an unusual amount of good judgment, in receiving ties. In no case should physical imperfections be permitted—bark on the edges, ties cut with a wind or crooked, or with a deficiency of heart on any face, should be summarily rejected. Reasonable uniformity of dimensions should also be insisted upon, as every roadmaster knows the error of placing a narrow or short tie alongside of a broad or long one. In other words, a close and rigid inspection will often save a year in the average life of ties on a road.

3. *Ties Should Not be Cut when Sap is Flowing Freely.*—As a result of some careful experiments with yellow pine ties cut in every month of the years 1884 and 1885 I have found that ties cut in January, February and June, in south Georgia, show at least 20 per cent. longer life than those cut in other months of the year. There is also an apparent advantage of about 15 per cent. in ties cut between February and June. I think, therefore, that yellow pine ties, to get the best durability, should not be cut between February and June when the spring sap is flowing. This also probably applies to other woods.

4. *Ties Should be Properly Seasoned Before Being Used.*—This is a self-evident proposition coming within the scope of nearly every man's experience or observation and scarcely needs demonstration. The drying out of the fermentable sap prevents the growth of fungus germs, and increases the life of timber considerably. Ties can be best seasoned by piling, so that a free circulation of air can be maintained through and around them.

5. *Proper Drainage of the Roadbed will Increase the Life of Ties.*—If kept well tamped up and pieced in good porous ballast ties will last much longer than on poorly drained soil. In some sandy soils, however, ties frequently decay much faster than in clay soil. This is an apparent exception to the general rule I have stated and is explained as follows: Warmth, air and moisture are necessary for fermentation. These are all present in the firm, compact sandy soil frequently found in all parts of the country, but with clay air and warmth are practically excluded.

6. *Proper Care of Ties.*—The practice of using picks to pull ties into place is destructive of their life, for the pick not only makes holes that admit water into the ties, but often splits the tie, thus providing an avenue for its rapid destruction. Tie hooks are much better than picks for placing ties. Old spike holes also are a prolific cause of decay and should be plugged with wood when respiking.

REPORT ON TRACK WORK.

Your committee on the best general method of doing track work upon the various kinds of ballasts under the following heads, stone, gravel, burned clay, cinders, sand, mud and loam, respectfully submit the following report:

1. . . . It is most essential to have proper tools and material, hand car houses, light hand and push cars being necessary articles for that purpose.

2. . . . Each foreman should have the same amount of work to perform, and when a section is found to fall below the average in condition it may be safely considered as due to the incompetency of the foreman.

3. Bridges, culverts and cattle guards should be kept free of all inflammable substance; all such matter should be taken a safe distance from the same and burned. the caps or sills of all bridges, culverts and cattle guards should be kept clean in order to give the timber its natural life.

4. Except in cases of emergency no work that will obstruct the tracks should be done during heavy fogs or storms.

5. All places on tracks where a man's foot might be caught should be kept filled.

8. The expansion of track should be closely watched, especially in the spring of each year, and where the rails have run together during the winter months.

9. All main tracks should be kept full bolted, full spiked, and in good line and gauge.

11. Track with stone, gravel, burned clay or sand should be trimmed off level with the top of the ties for a distance of two feet outward from the rails; from this point a gradual slope should be given. From the bottom of the slope a shoulder or berme not less than eight inches wide should be made. The slope from the shoulder or berme should be sodded to prevent its destruction.

12. Track with mud or loam ballast should have a shoulder the same as on other ballasts. The centre of the track should be filled 2½ in. above the tops of the ties, and as near as possible a gradual slope outward to the shoulder or berme, leaving the base of the rail open, and the bottom of the ties bare at their ends.

13. On account of many of the new rails not being perfectly rolled and in order to get the widest wheel bearing and level joints, the brands of all rails should be laid alike; rails of different lengths should not be laid together. Expansion blocks from one to four sixteenths inches should be used according to the temperature. Rail benders should be used for curving all rails laid on curves.

14. Section work commencing January 1st. In the Northern climate, where there is not sufficient ballast, the track generally by this time has commenced to heave and shimming is found necessary. Shims less than 1 in. thick should not be less than 8 in. long and 4 in. wide, placed diagonally under the rails. Shims 1 in. thick and over should be 12 in. long, and not less than 6 in. wide, spiked to the ties, and with four spike holes bored in each shim for spiking the rails. No shims thicker than ½ in. should be put in curves, and none thicker than ⅝ in. on straight track without being well braced. All shimmed track over ¾ in. should be double spiked. The work of shimming, tightening bolts and spikes, gauging track, shoveling snow, cleaning out ditches, repairing switches, fences, etc., in the winter months will keep trackmen busy. In climates where track does not heave, wet weather generally gives the trackmen as much, and in some cases more work than in the Northern States.

15. March. Frost now starts, and the track will go out of line and surface if not watched closely. Shims should be taken out and replaced by thinner ones as fast as the track settles. In the meantime foremen will generally find time to clean station yards and roadbed; when this work is completed foremen should commence at one end of section and tighten bolts and spikes, line track, pick up low places, clean out ditches, and put their sections in fair running order.

16. Ties should be spaced equally from centre to centre—the widest and narrowest ties should be mixed together. The best side of all ties should be turned up to save them from being cut into by the rails as much as possible. All ties when necessary should be adzed so as to give both rails a bearing the full width of ties; spikes should be driven on the same edge of ties between the rails to prevent them from twisting out of

square. They should be held firmly to the rails, and packed solid with puddlers or tamping bars. Roadbeds should be cleaned, the old ties taken out and piled up, and ballast filled in between the ties in track each night.

17. On or about June 1 surfacing should be commenced, each gang surfacing as much of the time as possible, and at the same time keeping the section in fair running order. Each gang should commence at the furthest end of their section and work homeward. By so doing the unsurfaced track can be looked over in the morning and evening of each day. Care should be taken not to raise the track in general off its bed, but to raise the low places only so much as it is necessary to bring them up to the general surface of the track. All shims to be taken out while surfacing. No track to be surfaced without the use of track level; tamping bars or puddlers should always be used. All tracks should be lined, gauged, cleaned and finished each night before quitting work.

18. July or August of each year, as the climate may require, the right of way should be mown. All such mown matter should be burned as soon as dry enough, and fires should be extinguished before leaving them.

21. Foremen should run over their sections daily, and see that the track, bridges, culverts, cattle guards and fences are safe, and when it is impossible to run hand cars the foreman and enough men should carry the necessary tools and walk over their section together, in order to stop trains from either direction and make any repairs which may be found necessary.

22. In case of severe storms or violent rains or winds, whether by day night, foreman should be required to make a thorough examination of their sections; the full length of section should be examined before stopping to make any repairs found necessary, and at the same time flagging all trains from both directions untill all is safe.

23. Each foreman should have the necessary intelligence to read and write and understand all the rules necessary in his business. He should beprovided with a book of instructions and have a reliable watch. The names of himself and men should be posted in the nearest telegraph or ticket office in order that they may be found at any time.

24. In conclusion, your committee desire to express their opinion that roadmasters and engineers direct too much Sunday work, and that no track work except what is absolutely necessary should be done on the Sabbath day.

(Signed)

Committee { O. J. JORDAN, Chairman, I. BURNETT, W. H. STEARNS, J. M. MEADE, E. F. SWART.

This report was adopted with the slight modifications noted last week.

REPORT ON TRACK JACKS.

. . . Your committee has seen newspaper notices of jacks that work below the rail, which could be worked at all times, without regard to the movement of trains, but we have been unable to find the inventors or manufacturers of such a jack,and we must therefore deal with those now in general use, and respectfully recommend the following standard and requirements:

For a standard we recommend a double acting, compound lever jack so constructed as to raise only half a notch at a stroke, up or down, made of two pawls of cast steel; frame to be of malleable iron, the lifting bar to be of the best grade of steel capable of standing a strain of 90,000 lbs. to the square inch. Bushing to be made of the best quality of cast steel, and so arranged as to be removed and replaced promptly by any ordinary section man.

For ordinary section work a jack of eight or ten tons capacity, weight not to exceed 60 lbs., with lifting bar not less than 1⅝ in. × 1⅝ in. in section, and to raise at least 12 in., with a base of about 7 × 12 in. . . .

We must have a jack that can be relieved quickly of its load, and removed from the track almost instantly, when required, and one that will sustain a large weight upon the lifting bar; positive in its action, speedy in doing its work, and durable in its design.

We trust the day is not far distant when a jack will be put on the market that will be so constructed that section men may never say that the jack was the cause of a wreck, by reason of faulty design. Until that time arrives, however, we do not deem it out of place to embody in this report the suggestion that roadmasters issue more stringent and definite rules with reference to the use of the track jacks, and that, wherever it is possible, to always work it on the outside of the rail.

In cases where it has to be worked between the rails and the view is obstructed, always protect the point of danger by a flagman as per time card rules. Should the foreman be short of men for flagmen, and cannot comply with such instructions (which is often the case), then use danger signals in the nature of flags and torpedoes, the required distance out from the place of danger. Where jacks are worked on double tracks, the man in charge must never leave it while it is in position under the rail. The chances for striking both man and jack are here double, and every precaution against accidents must be taken.

Committee { I. O. MANDEVILLE, F. C. CLARK, F. X. GALARNEAU, M. SHED, A. N. FREELAND, D. P. BEATTY, J. M. MEADE, Chairman.

REPORT ON INTERLOCKING.

Your committee have inspected the many systems of interlocking made by the Allentown Rolling Mills, the Johnson Railroad Signal Company, and the Union Switch & Signal Company, and find, that while the mechanism of each produces the same result, viz., safety and economy, each concern has special appliances for additional safeguards which are highly commendable, such as the Guerber rotary detector bar of the Allentown Rolling Mills, which commands attention by its ease of handling, strength and consequent economy of maintenance. It is an absolute preventative to the throwing of a switch under a train. The Guerber interlocking machine has complete preliminary latch locking, and is noticeable for the simplicity of the same, which is nevertheless applicable to the most intricate arrangement of tracks and signals as well as the most simple. Its construction is such that no amount of wear renders it possible to move or force the locking until the lever has reached the end of its stroke.

The automatic mechanical locking of interlocking levers of the Allentown Rolling Mills accomplishes successfully by simple mechanical means, as thoroughly reliable as the standard interlocking apparatus in general use, what has hitherto been sought to do by electrical means only, namely: The locking of the levers of an interlocking apparatus by the train so that when an operator has given a train the right of way over a section of track by clearing a signal, he (the operator) cannot move any switches on the route of said train, give any conflicting signals, or in any way endanger the train by haste or carelessness. The levers, which are locked by the clearing of the signal, remain locked until the train itself automatically releases them by passing over a detector bar and releasing instrument placed at the end of the section protected. The first wheel of the train unlocks the releasing instrument, but the detector bar continues the locking until the last wheel of the train has passed over it. The releasing instrument, being operated by the first wheel of each train only, successfully withstands the heaviest traffic. The interlocking switchstand of the Allentown Rolling Mills, with levers for operating distant signals, is also an admirable device.

The Johnson interlocking machine of the Johnson Railroad Signal Company has preliminary locking. . . . It has a simple and durable patent rocker movement,and the extreme simplicity of its special locking as performed by the patent sliding section of tapet is to be commended. Any part of its locking mechanism may be readily removed for alteration or examination without disturbing locking, having no relation thereto. All its ordinary and special locking is on the same plane. All its parts are made interchangeable. The machine is to be admired for the features it presents of economy in maintenance and adaptability to any arrangement of tracks at yards, crossings, drawbridges or tunnels. The signal slot or controller of the Johnson Railroad Signal Company is a device whereby two or more men may control a single signal.

. . . A special advantage of the Johnson slot is that the signal arm is forced both on "on" and "of," and not weighted to a "clear" position as in other slots. . . . The flag station signal of the Johnson Signal Company is for service in signaling trains for irregular stops. It is fitted with a slide for placing the lamp in position without the aid of a ladder. This signal is workable from the ticket office or the station platform. The compensating pot signal of the Johnson Railroad Signal Company is for use on either a pipe or wire connection, and works by means of an escapement crank. It is unaffected by any variation in the stroke of the balance lever.

The Westinghouse system of pneumatic interlocking of the Union Switch & Signal Co. is an elaborate apparatus in which compressed air and electricity are the actuating agents. The plant required for the purpose consists of a steam generating boiler, air compressor and condensing tank. . . .

Your committee earnestly recommends it to be recorded as the sense of our association, that all grade crossings, yard terminals, tunnel and drawbridge approaches be equipped with an interlocking system as a measure of safety to the traveling public and a source of economy to the railroad companies.

Committee { BOB BLACK, M. J. COMERFORD, W. H. STEARNS, GEO. E. DAGGETT, J. H. K. BURGWIN.

Appendix.

In regard to the position of derailing switch and general rules your committee would recommend:

1st. That the derailing switch point be put in at a distance of 250 to 300 ft. from the crossing frogs.

2d. That the guard rail be connected with the end of the stock or butt rail, extending parallel with main track rail and 8 in. distant to a point within 50 ft. of the crossing frogs.

W. H. STEARNS.
GEO. E. DAGGETT.
J. H. K. BURGWIN.

REPORT ON RAIL JOINTS.

Your committee has examined all joints here for trial, and find that we deem worthy of notice, and recommend for trial, the following new track joints: Continuous Rail Joint, Newark, N. J.; Heath Rail Joint, Minneapolis.

Attached are all papers and prints giving bearing strain, etc., for each joint recommended for trial, and your committee would suggest with your permission that the Executive Committee take charge of such trials and tests and report to the next Convention.

Further: Your committee has been busily engaged some time in getting together the reports, etc., from different owners of new joints, and from officials of railroads upon which the joints were last year recommended for trial test, and results to be reported to this Convention. The Executive Committee at their meeting held in Chicago on Oct. 11, 1890, selected the following railroads for trial of the different joints; each kind of joint to be put on one mile of track:

Weber rail joint, on N. Y., N. H. & H.
Long's trust joint, on Chicago & Northwestern.
McConway & Torley Co., on Manhattan Elevated.
Fisher joint (new improved), on Philadelphia & Reading.
Cloud angle bars; none known to your committee to be in use. All papers and reports incident to trial tests of above named joints are hereto attached, and respectfully submitted to this Convention for your action.

Committee, { B. MURTAUGH, Chairman. GEO. E. DAGGETT. J. G. KINDELAN. E. MCDONALD.

Mr. Stearns read a report on the Long joint as tried on the C. & N. W., but it was withdrawn as the reports on the other joints presented for trial were not presented.

CONSTRUCTION OF RIGID FROGS AND THEIR MAINTENANCE.

The rails used in the construction of frogs should be first class, and reheated as little as possible; the frog point should be planer work only, not heated and a large per cent. of the metal removed with a chisel while hot. . . Great care should be used in warming the wing rail at the points where they are to be bent in proper form, and they should not be bent cold. The planing of the point should be so perfect that a line drawn through a frog from toe to heel will touch the point its entire length. The point should not exceed ⅛ in. thickness at the point proper. The throat opening, or opening for flange way, should not excel 1⅜ in., then if the frog lines properly the opening at the knee will be the same as throat opening, 1⅜.

In putting a frog together the workmanship should be perfect in all its details. If a riveted frog, the drilling of the rails and plate should be so perfect that the rivets may be put in place without shearing them while being driven tight and riveted. If a clamped or bolted frog, with filling blocks, the blocks should be so planed as to form a perfect fit to all points of the filling space, and a wedge-shaped piece of iron should be used between the rails forming the point and ought to be a perfect fit to prevent drawing the point out of line when riveting together. This wedge should be 10 in. long in a No. 10 frog, and all bolts and rivets should be made from the best of iron in the lengths of frogs.

I would recommend a frog to be 10 ft. long and 4 ft. from toe to point and 6 ft. from point to heel for numbers from 8 to 11. . . .

A frog properly made and maintained I believe would give better results than we are getting to-day. . . . While frog makers may have done injustice, how has it been with the consumer? If they have an order for 100 frogs, the frog maker who bids 25 cents per frog cheaper than his neighbor, as a rule, takes the order. Again after the frogs are delivered to the company, what treatment do they receive? Plate riveted frogs are often thrown upon the ties not properly adzed to put them upon a level with the balance of the rails connecting with them. I find it a practice with many track men to spike their frogs, as they say, a little loose gauge, that means from ⅛ to a ⅙ in. This should not be allowed, and great care should be taken in keeping frogs to a perfect gauge. I have measured many frogs in track, in the past six months, and found the gauging to be from ⅛ in. to ¾ in. wide, and the guard rail to a close 2 in. with three guard rail braces to aid in holding it in place. What effect does it have upon the wear of a frog to increase the throat opening to 2⅛ in., then spike the frog ¼ in. wide gauge? I have been to some expense to demonstrate that point; I have had two frogs made, one of a 75-lb. rail section and one of a 60-lb. rail section, and in order to handle them easily I had them made from wooden rails that are perfect in form. I also havehad two sections of a 5 ft. driving wheel made; the templets were taken from the average tire of thirteen engines in round house, also a section of car wheel. As we increase the throat opening we increase the distance from the point of frog to the knee.

A frog made with 75-lb. rails with 1¾-in. throat opening gives distance from point of frog to knee of 20 in., and a straightedge touches every part from knee to heel of frog. A frog with 1¾-in. throat opening gives us 21 in. from point to knee; a frog with 2⅛ throat opening gives 23¾ in., yet you see that the straightedge touches every part from knee to heel. A frog having 1¾-in. throat opening, a driving wheel of an engine will take a bearing on the wing rail 16½ in. back of the frog point, and covers the wing rail 5 in. ahead of the point. A car wheel will take a bearing upon the wing rail of frog 12 in. back of the point, and covers the rail 7½ in. ahead of the point. A frog having 1¾-in. throat opening, a driving wheel will take a bearing on the wing rail 15 in. back of frog point, and covers the wing rail 6 in. ahead of the point. A frog having 2⅛-in. throat opening, a driving wheel will take a bearing on the wing rail 14 in. back of point and covers the rail 8 in. ahead of the point. A car wheel takes a bearing upon the wing rail 11 in. back of point and covers the rail 11½ in. ahead. A frog with a 2⅛ throat opening spike one quarter wide gauge, a driving wheel will take a bearing 10 in. on wing rail back of point and covers the rail 11 in. ahead of the point, a car wheel takes a bearing 6 in. back of point and full bearing on rail 14½ in. ahead of the point.

In view of above facts I would recommend railroad companies to exact perfect work from frog makers. And that the throat opening does not exceed 1⅜ in. and see that the frogs get proper care in laying and maintenance in track. I. BURNETT.

Mr. W. F. Ellis also presented a paper on Standard Frogs, which is held for a later issue.

The exhibits were as follows:

EXHIBITS.

Fontaine Crossing Co., Detroit. Model of Fontaine Crossing.
Jones' Positive Nut Lock, Chicago. Samples of nut locks.
Weber Rail Joint Co., New York. Model of Weber Joint. This joint was one of the five rail joints selected at Detroit for trial.
National Lock Washer Co., Newark, exhibited complete samples of washers.
Anderson Rail Joint, Chicago. A full-sized rail joint.
McMullen Woven Wire Fence, Chicago. Samples of railroad fence.
American Washer & Mfg. Co., Newark, samples of their new washer.
National Malleable Castings Co., Cleveland, a number of samples in malleable iron of railroad castings.
Standard Nut Lock Co., Newark, samples of washers.
Buda Foundry & Mfg. Co., Harvey, Ill., exhibited a line of hand cars.
Morden Frog & Crossing Co., Chicago, showed a line of frogs, crossings, etc.
McConway & Torley Co., Pittsburgh, samples of continuous rail joint. This joint was one of five recommended for trial, at Detroit last year.
Pettibone, Mulliken & Co., Chicago, exhibited a line of track supplies.
Bryant & Zimmerman, Wheeling, West Va., rail joints.
Niles Rail Joint, Chicago, rail joint.
Railway Equipment & Contractor's Supply Co., St. Josephs, Mo., rail bender and drill.
Schuttler Mfg. Co., Chicago, track drill.
American Nut Lock Co., St. Louis, samples of patent automatic nut lock.
Cleveland Frog & Crossing Co., Cleveland, showed a line of frogs, switch stands, etc.
Wier Frog Co., Cincinnati, exhibited blue prints and lithographs and a model of an automatic switch stand.
Dilworth, Porter & Co., Pittsburgh, samples of Goldie spike, etc.
Illinois Steel Co., Chicago, sections of rails.
Q. & C. Co., Chicago, the Servis tie plate, etc.
McSherry Mfg. Co., Dayton, samples of railroad jacks.
Verona Tool Works, Pittsburgh, a complete line of Verona nut locks and rail road tools.
Morris Sellers & Co., Chicago, exhibited the "Samson" angle bar and a new spike known as the "Greer."
Wm. M. Brewster, Chicago, the Long truss joint.
Avery &,West, Chicago, exhibited the Schuttler ratchet drill and the Harvey grip bolt.
Kansas City Switch & Frog Co., Kansas City, exhibited a model of Remillon's patent switch stands, etc.
Ruffner & Dunn, Schuylkill Falls, exhibited a large line of Excelsior single and double nut locks, etc.
Bush Surface Cattle Guard Co., Kalamazoo, exhibited the "Common Sense" surface cattle guard.
Fairbanks, Morse & Co., Chicago, exhibited a complete line of hand cars, railroad velocipedes and track supplies.
National Surface Guard Co., Chicago, exhibited the well known "National Surface Guard" illustrated in *Railroad Gazette* Feb. 7, 1890, and Sept. 4, 1891.
Heath Rail Joint Co., Minneapolis, sample of a new rail joint.
Dunn Safety Switch Co., Minneapolis, model of safety switch.
Leslie Bros. Mfg. Co., Paterson, exhibited at the Chicago & Milwaukee depot two of the rotary snow plows with steam on.
Ajax Forge Co., Chicago, rail brace.

The Heath Rail Joint.

The accompanying cuts show the Heath rail joint which was recommended for trial by the Roadmasters' Committee at the Minneapolis Convention.

It is a suspended malleable iron girder on ties twelve inches apart. The bed plate of the girder is given a camber to take the weight at the centre, and distribute it to the two joint ties, as in the Fisher joint. By thus distributing the weight over both ties it is claimed the rocking tendency of the joint is prevented, as also the vertical action of rail ends. The camber in the rail seat of this joint also obviates the contact of the sharp edges of the ends of the bed plate with the bottom of rail flange, thus preventing wear of the rail base, and pounding.

The Heath Rail Joint.

The web of the girder is carried both below and above the base of the rail and the portion of the girder above the bed plate rests against the side of the rail head, constituting a rail brace to keep the line of the rail ends. The bed plate is a channel to fit the rail base, and help in the preservation of the alignment. The rails are held by clips which seize the flanges, and are bolted under the bed plate, but not in the contact with the rails or other vibrating or wearing parts. By this means bolt holes in the web of the rail are unnecessary.

To obviate the creeping of rails, lugs are cast in the bedplate of the joint with corresponding slots in the flanges. Nothing in this joint operates to resist the contraction and expansion of the rail.

The Cedar Avenue Bridge.

(For Details see Page 651.*)*

We give herewith illustrations of a handsome braced arch of 150 ft. span, built in Baltimore, Md., by the King Iron Bridge & Manufacturing Company, of Cleveland, O. The following description of the bridge is furnished by Mr. C. H. Latrobe, chief engineer.

This bridge was built to connect the territory recently acquired by the city along its northern boundary with Druid Hill Park and vicinity, from which it was separated by the deep ravine of Jones Falls, and thus avoid a long detour.

The immediate banks of the falls being solid rock, it was decided to make the main span a segmental braced arch. Thus, the bridge beginning at its eastern end consists of a latticed girder span 72 ft. long; then a braced arch of 150 ft. span; then a latticed girder span of 72 ft., and then two plate girder spans of 25 ft. each, entering the park. The masonry consists of 2 abutments, 6 pedestals and 2 skew back piers, the latter of dimension stone. The latticed and plate girders consist of 3 lines of girder and the arched span of 3 ribs, hinged at the springing line and crown, placed 12 ft. apart, centre to centre. The carriage way is 20 ft.; the two footways each 10 ft. The structure is entirely of wrought iron, except joists and flooring, which are of Georgia pine, creosoted.

The masonry, built by Messrs. Jones & Thorne, of Baltimore, cannot be surpassed in quality. The superstructure manufactured and erected by the King Iron Bridge & Manufacturing Company, of Cleveland, was very well made and came together without any difficulty worth mentioning, showing excellent workmanship throughout. The hand-railing was made in Baltimore. The bridge answers its purpose admirably and has become a main thoroughfare.

THE CEDAR AVENUE BRIDGE—BALTIMORE, MD.

MR. C. H. LATROBE, *Chief Engineer.* KING BRIDGE COMPANY, *Builders.*

After trials on a short experimental track had demonstrated the mechanical practicability of the scheme, a section of street track was laid along Seventh street, in Washington, D. C. This is a single track, about one mile long, and in appearance and construction closely resembles a cable track, but in place of the cable there is a line of wrought iron pipe 8 in. in diameter, in sections about 20 ft. long. Abutting sections are connected by cast iron neck pieces, which form the couplings between the sections and also the journals on which the pipe or shaft turns. There is thus a double bearing about every 20 ft., and a coupling between each two adjacent bearings. On curves, universal joints are used instead of simple male and female couplings, and the sections are but 8 ft. long.

This shaft is revolved at a speed of from 200 to 250 revolutions per minute by Payne high speed engines of about 40 H. P. each, using compressed air, which are placed in vaults under the street about every 1,500 ft. The air for these engines is compressed by a pair of Ingersoll-Sargeant air compressors placed in a power-house near one end of the line, and is led to them by pipes laid along the shaft conduit.

The cars carry a substitute for the cable grip which consists of four friction wheels, which bear on the 8-in. shaft, the necessary frame-work, and the mechanism for changing the direction of these wheels. When the axes of the wheels are parallel to the main shaft, the wheels simply revolve without giving motion to the car; but when their axes are inclined, so that the wheels would appear to run spirally about the shaft, the car is moved along by a sort of screw-like motion. The speed of revolution of the shaft being constant, the speed of the car will, of course, increase as the angle of inclination of the friction wheels is increased. This angle can be varied through about 45 degrees in either direction by a hand wheel placed on the car platform, and the car may therefore be readily stopped or reversed or its speed may be altered. The tractive power is regulated both by the angle of the wheels and by the pressure with which the friction wheels are forced against the shaft, which is regulated by means of a second hand wheel, etc. Each of these friction trucks, which correspond to the cable grips, carries four friction wheels with their shaft bearings and the pivot bearings on which they turn when the inclination is changed, the necessary gearing for this change of angle, and two wheels for carrying the truck over the "bridge," which is necessary at each coupling of the main shaft. Add to this two main shaft bearings every 20 ft. on straight track and every 8 ft. on curves, and the loss of power in journal friction alone must be excessive.

This road was operated experimentally for from two to four hours per day, it is said, for about four months, but has never been opened to traffic. During this time many mechanical difficulties were encountered and to some extent overcome. Wood-faced friction wheels were at first used, but were not satisfactory, and wheels formed of compressed paper between copper flanges were finally adopted. Three forms of friction trucks have been tried, and the substitution of "grindstone" friction wheel bearings, in place of plain Babbitted bearings, for the main shaft was ultimately found to be advisable.

The plant has been lying idle since April, and the company is reported to be devoting its energies to the perfection of a street car motor, to be operated from a storage tank carried on the car. The indications are, therefore, that the ingenious threadless screw has proved to be an expensive object lesson.

The "Threadless Screw" Street Railroad.

During the many recent discussions concerning the relative merits of the cable, trolley and storage battery for street railroad traffic, the "threadless screw" system, which its promoters hoped would prove to be a successful competitor for street traffic, has been almost forgotten. But while it is not at all probable that this system will ever be extensively used, it is so novel and ingenious that it deserves a passing notice.

Natural Gas.

The recent failures of W. E. Schmertz and James A. Chambers, of Pittsburgh, the latter president and the former a director of the Chartiers Gas Co., have given rise to much anxiety in regard to the standing of the natural gas companies. This feeling has also been augmented by a recent article in a local paper, which is usually an authority in gas matters, announcing the complete failure of the natural gas supply and the substitution by the Philadelphia Co. of manufactured gas in its mains. A correspondent of the *Evening Post* (New York) has taken the pains to get at the facts of the situation, some of which are given below.

Mr. Schmertz was a wholesale shoe manufacturer and President of the Chamber of Commerce. Mr. Chambers is a prominent glass manufacturer and senior partner in the firm of Chambers & McKee. While both these gentlemen held large amounts of Chartiers Gas Co.'s stock, their failures did not affect the standing of the gas company in the least, though the sudden decline in the value of all gas stocks no doubt hastened their financial downfall.

The real situation in Pittsburgh as regards natural gas is far from serious, and there is no apparent reason to fear any sudden failure of the supply.

The leading natural gas company of Pittsburgh and vicinity is the Philadelphia, of which George Westinghouse is President. It is the lessee of the Chartiers, and has also a thorough understanding with the Peoples' Natural Gas Co. These companies almost entirely confine themselves to supplying private consumers. There is no profit in furnishing fuel to the iron and steel mills and glass factories, because of the immense waste. The Philadelphia Co. desires to get rid of the manufacturers, and has announced an increase of rates from 10 to 15 cents per thousand cubic feet. The increase will date from the first day of October. The rates to private consumers were advanced on the first day of this month from 15 to 20 cents, a raise of 100 per cent. within a year. A majority of the mills using natural gas, such as the establishments of Jones & Laughlin, Oliver Brothers & Co. and Park Brothers & Co., secure their supply from the Manufacturers' Co., or have their own private lines to the gas fields. The private consumers—if they will adopt the saving processes which are within the reach of all—will still find gas cheaper than coal.

It is well known that there has been considerable decline both in the Grapeville and Murraysville fields (Westmoreland County), otherwise there would be no necessity for the Philadelphia Company seeking new territory. At present the company is drilling eight wells in the Bellevernon, Fayette County, field. The result is not yet known, but since the extension of the pipes to Bellevernon two new fields have been developed, one at Elizabeth, the other in North Strabane Township.

The Canonsburg and Hickory fields of Washington County have been very productive, but their full value has never been felt for want of sufficient capacity in the pipes. This, however, will soon be remedied by the laying of ample mains. The Philadelphia Co. is now laying a 16-in. line to Moon Township, in which field it has already secured four wells, showing a minute pressure of 400 lbs., and rock pressure of nearly 700 lbs. This line also passes through a gas field in Stowe Township, recently developed, in which one well has been drilled by the Forest Oil Company, which shows a very large volume. In this field the Philadelphia Company has secured territory, and has made arrangements for the immediate drilling of wells. It has also secured two wells and considerable territory in Ohio and Franklin townships, about eight miles northwest of Allegheny City, one of these wells showing a pressure of 350 lbs. per minute, with a rock pressure of 650 lbs. The pressure recorded on the lines gives no indication to an outsider of the real supply, since if one-half pound can be maintained on the various lines throughout the city of Pittsburgh, a full supply is insured.

The promised plant for the manufacture of fuel gas will not be built this year, but Lemuel Bannister of the Westinghouse interests, says the plans for such a plant in Pittsburgh are all ready.

There is very little trading in the stocks of the natural gas companies. The public lost too heavily to repeat the experiment. Philadelphia led the "gassers" on the Pittsburgh Exchange. It is quoted around $12. Once it was at par, or $50. Chartiers is down just as low, although it once sold at $98.

The Harvey Steel Stock Car.

We illustrate in this issue, from a photograph, what is undoubtedly the most scientific metal car construction ever brought out in this country. It is one of a lot of cattle cars built for the Chicago, Milwaukee & St. Paul Railway by the Harvey Steel Car Company. The entire underframe is of steel, as are the posts, braces, plates, and carlines. The car has a very good appearance, and the exposure of the trusses is no objection for work of this sort. This car is built under the patents of George L. Harvey, mechanical engineer of the company. The following is a general description:

Length over sills	34 ft. 11 in.
Width over sills	9 ft. 3 in.
Length inside box	34 ft. 0 in.
Width inside	8 ft. 6 in.
Distance from top of sill to bottom of plate	6 ft. 5 in.
Capacity	60,000 lbs.
Weight empty	30,000 lbs.

The side sills are made of two steel channels each, placed together with the flanges turned outward. They are 6 in. deep and weigh 7 lbs. per foot. The intermediate sills are of the same dimensions as the side sills, the flanges being turned toward each other. These sills are clamped together by clamps, made of 1½ × ⅝ in. iron, above and below and secured by a bolt passing through between the sills. The centre sills are made of 12-in. steel channels, one for each sill. They are placed 10 in. apart so as to take the drawgear between them. These sills are deeper than the end sills, and the drawbar

HARVEY STEEL STOCK CAR.

passes, therefore, directly under the end sills. The end sills are made of two channels 6 in. deep, weighing 10 lbs. per foot, placed together with the flanges outward. The needle beams are made of rolled I beams 5 in. deep, weighing 10 lbs. per foot. The cross bracings are of channels 4 in. deep, weighing 5 lbs. per foot, laid flat and cut out to fit over the flanges of the longitudinal sills.

The body bolsters are made of two 6-in. steel channels extending across the car and laid flat, with their flanges upward. These channels are stiffened in the middle by two 4-in. I beams, placed vertically and extending outward to the intermediate sills where the side bearings are placed. The upper members of the body bolster are made of 2-in. × 1-in. bars, one for each 6-in. channel, with T heads on the ends and keys to tighten up the bolster. These can be seen in the cut, on the outside of the car, opposite the trucks. The buffer blocks on the ends are made of oak 7 in. × 7 in. × 30 in.

The side posts are of pressed steel, U shape, ⅛ in. in thickness. They are fastened at the bottom and top by a lug bolt ⅞ in. in diameter, with a nut on the top and bottom ends. By means of these nuts, the posts, sills and plates are drawn tightly together. The carlines are made of pressed steel of U shape and curved to the form of the roof. The compression members of the side truss are of 3-in. × 2-in. steel angles. The tension members are of steel rods, as usual. The roof covering is of No. 22 flat iron, joined by a special raised joint. The sides of the car from the roof to the bottom of the hay racks are covered by No. 24 beaded metal to protect the hay rack from sparks, and to form a letter board.

The floor is made of 8-in. × 3-in. No. 1 white pine, dressed and matched, and secured to the sills by wire nails at each bearing. There is a nailing strip of 2 × 6 in. yellow pine secured to the top of each sill by ½-in. carriage bolts. This is below the floor. The roof sheathing is of ⅜-in. white pine matched and nailed to the carlines.

The cars are equipped with the Westinghouse automatic brake and rigid trucks. The trucks are built by the Harvey Company and are of new design. The journals are 4¼ × 8 in. M. C. B. standard. The wheels are 33 in. in diameter, double plate Washburn pattern, weighing 600 lbs., and guaranteed for 48 months service. This truck has steel bolsters made of 10-in. I beams, weighing 25 lbs. per foot, and a 12-in. steel channel plank. In spite of the fact that this truck is of extra capacity and has heavy parts, the simplicity of the design is such that when completed the total weight is about 11,500 lbs. with 600-lb. wheels and large axles. The trucks are equipped with the National hollow brake beam, Congdon brake shoes, Schoen pressed steel centre plates, and the Pennsylvania "W" spring with pressed steel spring plates.

It is rather an interesting fact that all the pressed steel used in the construction of this car, including the draw gear, carlines, posts, doors, etc., with the exception of the centre plates and spring plates, is made at the Harvey Steel Car Works on the ordinary "bulldozer." Probably at no other shop in this country is such good work done with the bulldozer as at these works. The largest piece made so far is a complete side door for a freight car.

The success of this car enterprise is assured, if we are to judge from the orders already received and those in prospect.

General Passenger Agents' Convention.

The American Association of General Passenger and Ticket Agents held its fall meeting at Old Point Comfort, Va., on Tuesday of this week. The business was mostly of a routine nature and the convention adjourned to meet next spring at Monterey, Cal.

The principal address was by Mr. James L. Taylor, General Passenger Agent of the Richmond & Danville. Mr. Taylor, after a brief review of the history of transportation from the earliest times, took for his subject the maxim, Civilization is chiefly a matter of Transportation. He referred to the interesting exhibit illustrating this at the Paris Exhibition of 1889, and set forth the facts corroborating the statement that our country affords the best example of the development and benefits of transportation. Authorities were quoted showing how the locomotive in America had nearly revolutionized the social system in parts of Europe.

"No other race of men travels as do the Americans. From the constant interchange of thought among the commercial classes comes that intelligent knowledge of their country that no other nation possesses in the same degree. The pleasure seekers that flock to the summer and winter resorts of this continent and the thousands of our tourists that seek foreign lands have made the reputation of this people as the greatest travelers in the world. The English even are outnumbered by Americans in every country of Europe except England itself. From this contact with foreigners the American returns to impart to his circle of acquaintance the practical information he has gathered, and thus is widened the scope of daily thought. An important result of travel to the sensible traveler will be a tolerance of judgment, and the kindling of a glow of patriotism in his bosom.

"Nowhere may the American journey in such comfort and enjoyment as in his own land. The counterpart of the Vestibuled Limited does not exist in any other country. What other nation save America could start its ruler off on such a journey as that taken by President Harrison last spring? What other ruler could travel in such state? What other country's railroads could transport him over a length of 10,000 miles under such conditions, and return him to the nation's capital on the exact minute of his prearranged schedule? Guarded only on his long and rapid voyage by the loyalty and respect of the people and the unsleeping vigilance of railway men, he accomplished his wonderful journey without accident of any kind; and the people see nothing strange in that fortunate termination, so confident are they in the perfection of the railway system of this country. Where but in America could the President have found such a guide, philosopher and friend for such an expedition as he found in the amiable Boyd, and where but in the ranks of our profession could he have discovered one so well equipped to carry such a task to its honorable and fortunate conclusion?"

The speaker referred to Judge Cooley's characterization of the extravagant luxuries furnished by American railroads, and said:

"But while the learned judge may lament this feature of the railroad problem, and deprecate the extravagance of the railroads in thus ministering to luxurious ease, the public will be educated to a higher civilization by comforts in traveling to which they are perhaps not accustomed at home; but it will not be long before they will have at home what they become accustomed to in travel, and in this way transportation still ministers to a higher civilization."

Shop Notes—C., B. & Q.

The shops of the C., B. & Q. at Aurora are very busy. The large amount of freight now being moved brings all the departments up to the full working capacity.

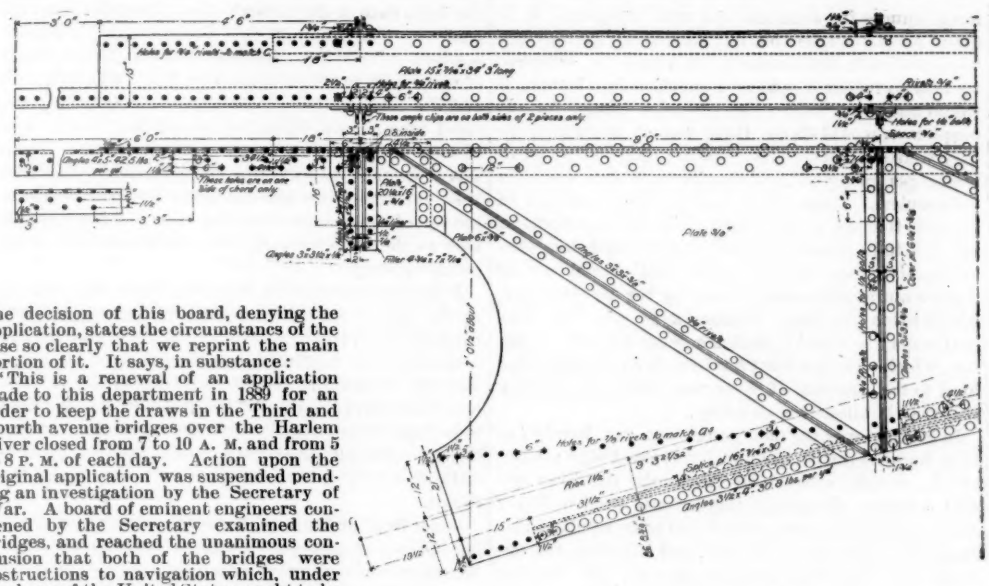
In the car shop they are completing the sample freight car, which represents the type of which 2,000 have been ordered with an option for 500 additional. These cars are to have the Janney couplers, air brakes, and collarless axles with Fletcher lids on the boxes, hinged at the side. The car bodies have iron transoms of the same form as the furniture cars, which is a decided improvement over the common form. It costs a little more, but is decidedly better. They will use the new Fox solid pressed steel centre plate. It has a large bearing, and is made in a new way to obviate difficulties hitherto found with pressed centre plates.

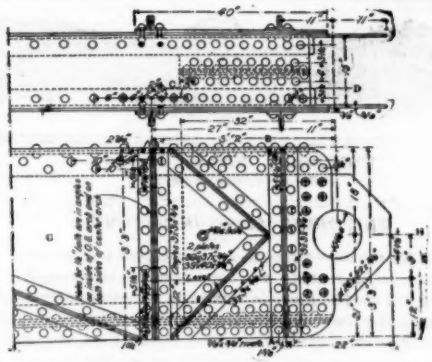
For these 2,500 cars the tail bolt will be used instead of the strap on the couplers. This has been done for a very important reason, namely, that with the strap on the end of the draw bar, whenever the draw bar pulls out, the shoulders of the strap wreck the end sills and rip off the draw bar support; whereas, with the tail bolt no difficulty of this sort is met. The draw bar pulls out without interfering with any portion of the sills or draw gear. This is particularly necessary in this style of car, where the draw bar passes through the end sill and the draw bar rigging is between the centre sills of the car. There are no draft sills.

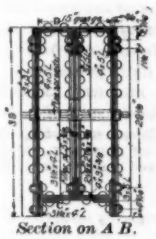
These cars have the low floor of the same height as the furniture cars. They are made 34 feet long instead of 35 feet, in order that the trains having these cars may be of the same lengths. The additional one foot used on some previous cars resulted in inconvenience at transferring points, causing a continual shifting of the trains owing to the difference in the length of the cars. All these cars are sheathed on the inside at the sides and ends up to the roof. It is evident from this order that the C., B. & Q. will hereafter use only this height of car floor as there have been only favorable reports since it was first tried

Harlem River Drawbridges.

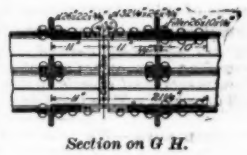
It will be remembered that one of the methods adopted in the effort to abolish or mitigate the serious delays, by open draws, to trains entering the Grand Central Station, New York, was an application to the Board of Park Commissioners of the City of New York to take action in the matter, though there was apparently no reasonable ground for expecting that that board would have final power in the matter, if indeed it had any at all.





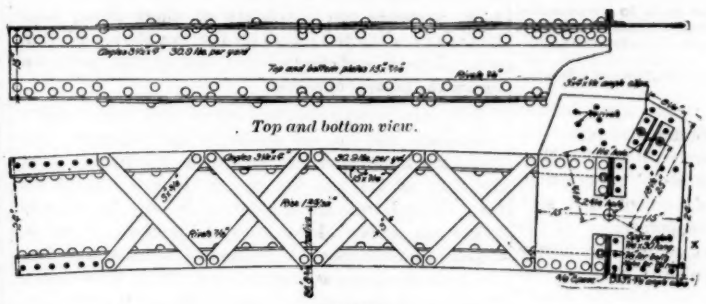


Section on A B.



Section on G H.

Details at Centre of Rib.

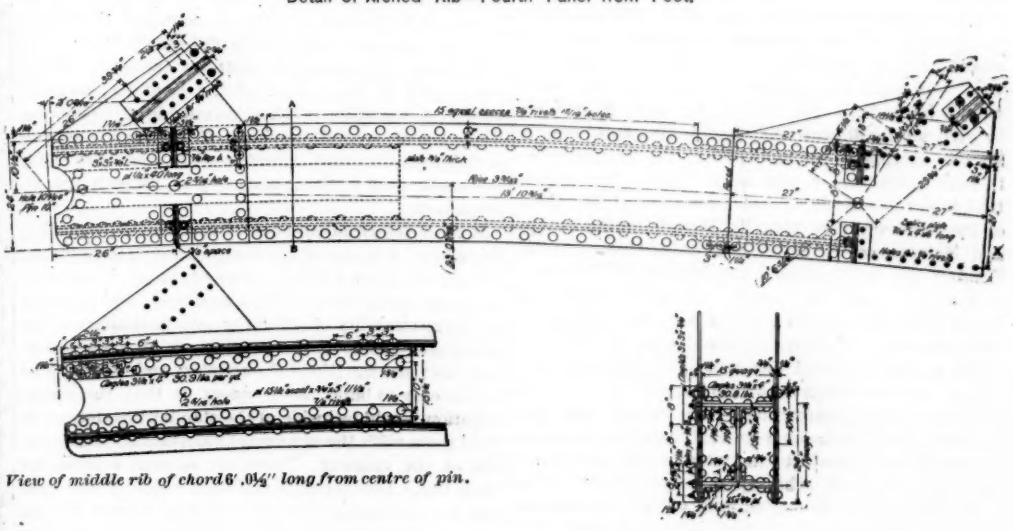


Top and bottom view.

Side view.

End view.

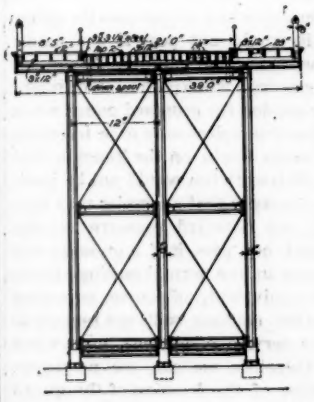
Detail of Arched Rib—Fourth Panel from Foot.



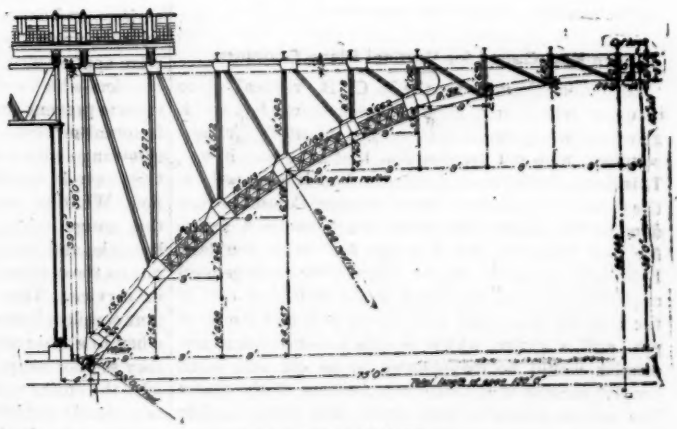
View of middle rib of chord 6′ .01⅝″ long from centre of pin.

Bottom end view is also section of chord on A B, except outside plates.

Detail of Arched Rib—First Panel.



End View Arched Span.



Elevation One-Half Rib.

CEDAR AVENUE BRIDGE—ARCHED SPAN OVER JONES' FALLS—BALTIMORE, MD.

Built by the KING IRON BRIDGE AND MANUFACTURING COMPANY, *Cleveland, O.*

The decision of this board, denying the application, states the circumstances of the case so clearly that we reprint the main portion of it. It says, in substance:

'This is a renewal of an application made to this department in 1889 for an order to keep the draws in the Third and Fourth avenue bridges over the Harlem River closed from 7 to 10 A. M. and from 5 to 8 P. M. of each day. Action upon the original application was suspended pending an investigation by the Secretary of War. A board of eminent engineers convened by the Secretary examined the bridges, and reached the unanimous conclusion that both of the bridges were obstructions to navigation which, under the laws of the United States, ought to be removed. They found that the remedy was to increase the span of the draws and to raise the bridges to a clear height of 24 ft. above high water The Secretary of War, upon this report and in pursuance of the statute above cited, has ordered the city and the railroad company to change their respective bridges according to these requirements. Congress has specifically confirmed this action of the Secretary, and by Chapter 907 of the Laws of 1889-90 directed him to cause the changes to be made.

". . . . If the bridges were raised to the height indicated the draws could be kept closed during the morning and evening hours without stopping tugboats and barges; and the act of Congress of 1890 directs that when the bridges have been raised the draws shall be kept so closed. The present application calls upon us to ignore these directions of the Federal authorities, and to formally authorize an increase of the obstruction to navigation. This proposition would be sufficiently serious if it led to a conflict with only the ordinary exercise of Federal jurisdiction over a navigable waterway of the United States. In this case, however, the Government of the United States is actually engaged in improving the navigation of the waterway upon the earnest solicitation of the City of New York. To induce it the legislature of the state (1879) ceded to the United States jurisdiction over the territory occupied by this waterway and crossed by these bridges. And in 1882 the City of New York formally conveyed to the United States its title to the land under water across which these bridges extend. Moreover, the remedy which the Federal authorities propose is simply to make the bridges conform to the standard adopted by the legislature of this state in 1879. So that the War Department, the Congress and the State Legislature all agree as to the kind of structure. . . .

"It is the duty of the city and of the railroad to promptly conform their bridges to this standard. The only reason presented for not following this course is that some legislation is required to authorize the necessary changes of grade for the bridge approaches. The legislature has shown no disinclination to grant such authority. The railroad company introduced a bill at the session before the last relating to its bridge at Fourth avenue. It passed both houses, but was vetoed by the governor because it failed to protect the rights of adjacent property owners. There is no evidence of any attempt by the railroad company to remedy the defects of that bill or to obtain any other or further legislative action.

"The legislature cannot be expected to move of itself in such a matter. The parties upon whom rest the obligation to move in the matter are not entitled to ask that other interests be sacrificed in order to relieve them of the temporary inconvenience caused by their own failure to act.

"To authorize the closing of the present draws would remove the incentive which they now have to seek the legislation and make the changes required, and would postpone the effective and permanent solution of the difficulty. It would place us in an attitude of defiance toward the Federal authorities in relation to a great work of public improvement which they are prosecuting at our request, and it would be unjust to the business and property interests affected by the navigation of the Harlem. It is far better for the residents north of that river that we and they should unite with the Federal authorities in demanding the application of the true remedy to the evil of which they complain.

"For these reasons the application should be denied."

Tall Buildings in Chicago.

Several weeks ago, when it was proposed in Chicago to build a 38 story building for the Odd Fellows' Temple, the project was considered an out and out speculation, and no one ever thought it would reach a serious consideration; but now it is evident that the plan was based on estimates which showed the feasibility of the structure proposed and the revenue to be derived therefrom, and the site is about secured. It is expected that the building will be on the northeast corner of La Salle and Monroe streets. It is almost in the centre of the business portion of the city. The structure, if placed here, will be about 167 ft. long on La Salle street and 232 ft. on Monroe street. It is to be 556 ft. in height and is intended to be one foot higher than the Washington monument. The upper stories are in the form of a tower supported from the body of the main building below. The preliminary sketch of the structure resembles somewhat the Auditorium.

A large apartment building to be named the "Mecca" is to occupy the south end of the block bounded by 33d, 34th and State and Dearborn streets. The building will have a frontage of 226 ft. on 34th street and 234 ft. on State and Dearborn streets. It is in the form of two wings. Each floor of the building will contain 1½ acres of floor space, and the four floors will have a total of six acres. The plans for the building were made by Edbrooke & Burnham, and contracts for the erection have been let to Shields & Cook. The 98 flats, with five occupants each, will furnish homes for 500 people.

RAILROAD GAZETTE

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At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

We give in this week's issue a pretty complete abstract of the papers and reports presented at the Minneapolis convention of the Roadmasters' Association. The first comment upon these documents that suggests itself is an expression of disappointment at the meagre and really worthless report of the committee on rail joints. It will be remembered that several joints were chosen last year for actual trial in track, and it is understood that some evidence was collected and available as to the performance of these joints, but it was not presented at the convention. While nobody, except possibly a few inventors, expected a conclusive report from one year's experience with these joints, it was reasonable to suppose that enough facts would have been ascertained to make it possible to give an intelligent and useful progress report. So far as appears to an outsider the matter is no further along than it was a year ago. The papers that deserve particular mention are those of Mr. Reed on the Preservation of Ties, Mr. Burnett on the Design and Maintenance of Frogs, and of the Committee on Track Work. Mr. Reed really contributes some information and so does Mr. Burnett, and the Committee on Track Work put some well known facts in a very useful and clear way. The report of the Committee on Track Jacks is also a useful one, and it suggests that Mr. Fisher has not taken means to bring his jack to the attention of the roadmasters. We notice that the Committee on Interlocking omits all mention of one of the companies manufacturing interlocking apparatus, that is the National. This report is useful in bringing to the attention of the roadmasters various appliances that they cannot know too much about, although we have omitted nearly all of it as being of a very elementary character. The President of the Association gave the members something to think about. Perhaps the politicians will begin to realize that there is a "railroad vote," when the movement recommended by Mr. Doyle becomes a little better organized.

The New Gauge for Vertical Plane Couplers.

The standard guage for the M. C. B. vertical plane couplers which was adopted week before last and is given in these columns this week is intended for new couplers, and not for couplers that have been in use. This should be borne in mind; the fact is stamped on the faces of the gauges. The Executive Committee has done well in making the distinction between a gauge for new couplers and a gauge for worn couplers. Evidently, a worn coupler has not the same general contour as the new one owing to the swinging out of the knuckle due to the wear of the lock and the pivot pin, and a gauge which is suited to measure a new coupler would be inapplicable to an old and worn coupler because of the different positions of the centre line of the knuckle, that centre line being used to locate the new gauge. Hence, if the knuckle swings outward a little by reason of wear, the gauge follows it, and is no longer properly located to test the accuracy of the guage arm and other parts of the coupler head.

There is another and obvious reason for making different gauges for worn and for new couplers. It is this: An old coupler that has been in service may not be according to the standard, yet it may be sufficiently near to render it safe and practicable. Hence, it would not be advisable to adopt such a gauge for old couplers as would throw them out of service when they were still serviceable. Such would be the result if a proper gauge for new couplers was also used for old couplers. There are in service a great number of couplers that are not according to the standard contour, and it is to be regretted that it is so; nevertheless, they are in service and are still useful and should not be thrown out at interchange points by the use of a gauge, which is too exacting. Perhaps next year the committee may be asked to design a gauge for worn couplers, which will give what has long been demanded, a limit to the amount of wear and increased opening that may be allowed with safety.

In looking over the new gauge one can hardly fail to be impressed with the novelty of the design; without the completeness which this gauge furnishes and with a simple solid gauge there would need to be six or seven different ones to reach the same results. This gauge is really a composite one, and contains the elements of at least four different gauges. No attempt is made to test with it exactly the accuracy of the contour between the vital points, but the close approximation of the base casting of the gauge, in which the moveable points are placed to the standard contour, prevents any possibility of there being large lumps or contracted places on the couplers, and thus it furnishes a sufficiently close test of the parts between the moveable points.

It is to be noticed that this gauge will pass couplers which are flat on the inside of the knuckle, provided the knuckle is of the proper thickness. Also, the face of the knuckle can be bulged out to the form desired by some builders who hope in this way to get less severe blows on the knuckle. It will be noticed that the movable points are placed where they are most useful in assuring a long life to the coupler. This is more particularly true of the point at the heel of the knuckle and on the face of the guard arm. To prevent a slackness of the head or knuckle at these points is to secure a railroad company from purchasing couplers which have defects limiting their usefulness. The movable point on the centre line of the coupler in the throat of the head has no great value. A variation at this point outside of the contour line is not of special moment. If the head is too full at this point it would interfere with coupling; but if it is slack, even to the extent of $\frac{1}{4}$ of an inch, it is no detriment.

If there is any adverse criticism to make regarding this gauge, it is not of its design, that is admirable; it is rather of the deviation allowed in the location of the guard arm. Some have questioned, and continue to, the advisability of allowing any deviation of the guard arm outside of the contour, as all such deviations decrease the life of the coupler; and it would be just as easy to build the couplers so that the entire variation would be inside of the standard contour as to build them with the same total variation one-half each side of the contour. There are several reasons for doing this. One is that a variation inside of the contour does no harm. The couplers will couple just as well for all practical purposes, and there is sufficient spring in the parts to enable them to go around any reasonable curvature when new, and they will soon wear so that a gauge applied would find the guard arm at the contour. Also, when a coupler is put in service in a train with a heavy load, the knuckle springs, and a new coupler which would pass the gauge without strain upon it would not pass if the gauge were applied with the locomotive pulling. There are couplers which spring enough when pulling an ordinary train to prevent their passing the proposed gauge when in actual service. If new couplers were to be tested by this gauge with the same strain on the knuckle that they have in service, this criticism would not be justified. What we mean to say is that a coupler may pass this gauge without any outward pressure on the knuckle, and yet would not pass it if a pressure was put on the coupler equal to the normal pulling strains in service. This is equivalent, of course, to saying that couplers built to the contour will not remain so when in a train under service conditions, even when they are not worn; therefore we can see no reason why the entire variation of the location of the guard arm should not be within the contour and not at all outside of it. Perhaps if couplers were built with the variation at the guard arm all inside of the contour, they would be in actual service more nearly to the contour than if the variation is allowed on both sides.

The life of a coupler knuckle, and to some extent the coupler head, is limited by the amount of movement of the inner face of the knuckle away from the standard contour. The limit of this variation has, of course, not been settled; but some roads have decided the limit of movement to be not more than $\frac{1}{4}$ in. This is small, and if a comparatively greater amount is finally decided upon, it will be still small compared to the rate of wear in passenger service more particularly. From this it would also seem that there should be no allowable variation from the contour which would reduce the life of the coupler from the time it is put into service to the time when it is thrown out because of too much opening.

It has been claimed by some who have been looking up the limit of life of the vertical plane coupler, more particularly in passenger service, that it would be more economical for a railroad company to purchase couplers with an opening reduced one-eighth of an inch below the opening given by the standard contour than to purchase them exactly according to contour, there being no difficulty in operating such couplers, particularly if a little additional clearance is given in the throat.

Regarding the limits of variation allowed as affecting the cost of manufacture, there has been considerable discussion. Coupler manufacturers generally believe that there is not sufficient variation to enable the couplers to be produced at a reasonable cost; and with this we must agree, as it cannot be expected that ordinary castings, such as those of steel and malleable iron, can be assembled with reference to each other, without machine work, within the prescribed limits of these gauges. This will appear to be more strictly true if one considers the amount of necessary draft in the patterns in order to pull them from the sand. There was not at the recent railroad conventions, among all the couplers presented, one which was constructed with sufficient accuracy to enable it to pass these gauges; and we may be sure that the couplers exhibited were about the best that the manufacturers could produce with their present appliances. There was not a coupler at the conventions which did not have more than double the variation from the standard gauge that is prescribed in the new templets. Evidently, then, before couplers can be built to this present requirement there will need to be some improvements in the method of manufacture.

Those who are making wrought iron knuckles in dies will probably have less trouble to meet the knuckle dimensions than those who are using cast knuckles; but as cast knuckles are meeting with increased favor, we may expect that with the majority of makers, if not with the majority of the couplers made, it will be found difficult to keep within the limits of the knuckle gauges. Those couplers which have the knuckles put into the heads with drilled pivot pin holes can more readily be made to meet the requirements of the location of the guard arm with reference to the knuckle than those which fit in recesses without pins. This can be done by making a cast iron "jig" or block which has the proper shape for the interior of the throat of the completed coupler from the guard arm to the end of the knuckle. By slipping this block into the head and bringing the knuckle up against it and holding it with clamps and placing the locking pin in position and bringing the tail of the knuckle against it, and then drilling the pivot pin hole with the knuckle clamped firmly in position, there will result an accuracy of location with reference to the guard arm which will meet the requirements of the new gauge: but this will throw the entire variation to the heel of the knuckle, where the allowance of $\frac{1}{32}$ in. will be found to be extremely small with rough castings.

However, the form and design of the gauge is settled, and in a manner which is highly creditable to the Secretary who made the design and to the Executive Committee who adopted it. The limit of variation may or may not be the best. If it is not found to be so, then it is easily changed by altering the thickness of the milled collar on the movable points. The thicker the collar the less the variation allowed, and the thinner the collar the greater the variation. To change the variation to be all on one side of the contour it is only necessary to shift the milled nut along to a proper position on the movable point. From this it will be seen that the gauge is a decidedly flexible one and will meet the requirements, and it marks the most important step taken with reference to an automatic freight car coupler since the adoption of the standard contour.

Minneapolis versus Duluth.

The forces which are acting to change the course of traffic and consequently the railroad situation in the Northwest give occasional evidence that they are steadily at work. Some three weeks ago the Chicago, Milwaukee & St. Paul issued a joint tariff with the St.

Paul & Duluth by which it quoted the same rates to Duluth from a large part of its wheat section as to Minneapolis. The citizens of Minneapolis were at once in arms against the discrimination, and, on the face of it, the fact that the wheat was to be hauled 150 miles from Minneapolis to Duluth for no additional charge certainly has an unpleasant look. When, however, the matter is further examined, it is seen that the action of the St. Paul was inevitable and necessary for its own protection.

The Northern Pacific has an almost straight line from the Red River Valley to Duluth, its line to Minneapolis leaving the Duluth road at Brainerd, the distance being some 30 miles in favor of Duluth. The Great Northern between these sections is a little longer, but it must make the rates on wheat the same as the shortest line, the Northern Pacific; so wheat rates from all points in North Dakota are the same to Minneapolis as to Duluth. Both these companies have branches extending out into South as well as North Dakota, and from these also the wheat tariffs are generally the same to the two cities.

The prices paid for wheat are about five cents higher at Duluth than at Minneapolis. This is due partly to the action of the millers and buyers in the latter city, who exact from the wheat grower the differential which the railroads have not been willing to give them; this differential being considered due to Minneapolis because it costs 7½ cents per 100 pounds (or say five cents per bushel) to transport the wheat from Minneapolis to Chicago or to Lake Superior; the same principle being applied to flour. The Minneapolis buyers have been aided by the fact that there was a number of important wheat carrying roads which ran to Minneapolis only, the farmers along these lines being obliged to sell in Minneapolis at the regular quotations. The most important of these Minneapolis roads was the St. Paul, which now opens the Duluth market to its shippers.

This action was forced upon the St. Paul. Its lines into North and South Dakota crossed the Northern Pacific and Great Northern branches at many points. At these points the price paid to the farmers for wheat was the Duluth price less freight and commissions. This competitive wheat would all go to Duluth unless the St. Paul reduced the Minneapolis rate five cents, or unless prices went up five cents per bushel at that city. The former was out of the question, for the rates over the whole wheat section would have been disturbed; the latter was equally impossible at present, so long as so much wheat had to seek the Minneapolis market. But under these conditions this competitive wheat was all going to Duluth, depriving the St. Paul road of the carriage. Further, every little local town was affected by the price paid for wheat at the junction village; so that all the wheat-growing section was working against the St. Paul road in order to get Duluth quotations for its grain. The only thing for that company to do was to offer its shippers Duluth prices by opening a route to that point.

Some roads, like the Soo system, already have Duluth rates in force, and other roads, like the Minneapolis & St. Louis, will follow suit for protection to their own interests, so grain will move to Duluth in increasing quantities until the Minneapolis price is the same as the Duluth quotation. This will not be the immediate result, but in the end it is certain to be reached.

The Minneapolis millers being now able to buy wheat at five cents under Duluth prices, do not care about the competition at the lakes; it is the real estate and business men of that progressive city who manifest the most concern. The present mills, even with wheat the same as in Duluth, might find it possible to continue manufacturing at a small profit by reason of the milling-in-transit system, so that the disadvantage of the geographical position of Minneapolis would not be an insurmountable obstacle. Yet the Mississippi River already fails to furnish all the power needed, while coal costs $1.50 per ton more than in Duluth. The present concentration of capital and experience at Minneapolis cannot easily be overcome, yet the situation points to a time when the advantages of cities on the lakes will take a large share of the manufacturing and jobbing trade away from St. Paul and Minneapolis. It is a truth illustrated in all commercial history, that as between a city on a system of great waterways and an inland city, the latter must succumb in time. Duluth and other Lake Superior cities must at last obtain the wheat and the trade of the Northwest, as against St. Paul and Minneapolis near by, or the distant Chicago. The latter is handicapped in the Northwest by the fact that the city is 500 or 600 miles further from the grain and trading section than Duluth, though no nearer the seaboard by lake. There is a winter season on the lakes to be remembered, but the rail lines to the Northwest via the Sault seem determined to carry the rate conditions favoring the Northwest in the summer through the winter also.

Cylinder Volumes for Compound Locomotives.

We have referred at different times to the importance of different designs of compound locomotives for different kinds of service. As an example of this, we call attention to the Southern Pacific compound by the Schenectady Locomotive Works, published last week. These engines are intended for heavy service on grades, and are of the 10-wheel type, weighing 99,500 lbs. on the drivers, and have 20 and 28 × 26 in. cylinders. The driving wheels are 55 in. in diameter, and the steam pressure is 180 lbs. per square inch above the atmosphere. Let us now compare this engine with the 10-wheeler designed by the same locomotive works built for express service on the comparatively level Michigan Central Railroad. This engine has 20 and 29 × 24 in. cylinders, weighs 97,000 lbs. on drivers, has 68-in. driving wheels, and 180 lbs. boiler pressure per square inch above the atmosphere.

We cannot enter into a discussion of the subject to show fully why it is so, but it may be accepted that the volume of the low pressure cylinder is indicative of the power of a compound locomotive. If two engines have the same size low pressure cylinder, they will have almost identically the same cylinder power when using steam at the same pressure with the same number of expansions. This statement may be so general as to be subject to criticism; but for our present purpose it may be accepted as true, and we may proceed with the comparisons.

The volume of a 28 × 26-in. cylinder is 15,990 cu. in. The volume of a 29 × 24-in. cylinder is 15,850 cu. in.; hence these cylinders have almost identically the same capacity. As the steam pressure is the same, the comparative amounts of work that may be done in the cylinder per mile traveled, with equal mean effective pressure, will bear the same ratio to each other as the inverse ratio of the diameters of the drivers. The ratio of 55 to 68 is 1 to 1.235; hence the Southern Pacific engine has, in proportion to the weight on drivers, which is nearly the same in both cases, about 25 per cent. greater cylinder capacity, and for an equal pull on the drawbar there may be for that reason a considerably greater expansion than with the Michigan Central compound. Increased expansion is what is desired in compound engines, and we believe this increase of cylinder capacity in the Southern Pacific engines to be a step in the right direction. It is practically the equivalent of increasing the cylinder ratio, as the number of expansions that can be obtained from steam in a two-cylinder compound depends, not so much on the cylinder ratio, as on the absolute volume of the low pressure cylinder, and in this case a still greater expansion could be obtained by increasing the stroke of the low pressure cylinder above that of the high; for instance, there would be no objection to one side of the engine having 26-in. stroke and the other side 28-in. stroke.

We are glad to see this increase in low pressure cylinder capacity for two-cylinder compound locomotives. It is just what is needed to make that type of engine a success. The two-cylinder engines that have been built in this country thus far have not had sufficient volume in the low pressure cylinder to give the best results from compounding. In England the capacity of the low pressure cylinder is greater in the Worsdell type in proportion to the weight on drivers and the diameter of the drivers than in this country. For instance, the Worsdell compound described in the *Railroad Gazette* March 28, 1890, has 20 and 28 × 24 in. cylinders; the driving wheels are 7 ft. 7¼ in. in diameter; the weight on drivers is about 37,000 lbs. The volume of a 28 × 24-in. cylinder is 14,775 cu. in. Comparing this with the Michigan Central compound having 29 × 24-in. cylinders with a volume of 15,850 cu. in. and making allowance for the difference in the diameter of the drivers, we find that the Worsdell express compound locomotive has 80 per cent. more volume in its low pressure cylinder, compared with the work which the cylinders have to do, than the Michigan Central compound. This difference is easily seen from an inspection of the general dimensions of the engine, the Michigan Central being 20 and 29 × 24, with 68 in. wheels and 97,000 lbs. on drivers, and the Worsdell being 20 and 28 × 24, with 91-in. wheels and 37,000 lbs. on drivers.

Aerodromics.

By this title Professor Langley, in his memoir on aerodynamics,* has indicated "the yet inchoate art of constructing suitable mechanisms for guiding heavy bodies through the air" on certain principles which are enunciated therein and which we shall presently refer to. At the outset of this review it will be well to state that these principles are entirely distinct from any associated with ballooning and cannot fail to receive attention, if for no better reason than because of their novelty.

In glancing back over the narrow field wherein efforts have been made by man to fly we see that, leaving out a few abortive attempts to make a bird of himself by fastening on wings, his various contrivances for traversing the air have been based upon the principle of buoyancy, as exemplified in the balloon. The balloon itself, fitted only for rising and falling and incapable of horizontal movement excepting by the action of uncontrollable air-currents, does not, strictly speaking, come within the category, and outside of a very limited employment for observation purposes is worthless. To supply its deficiencies, and make of it a self-propelling and dirigible vehicle has usually been the aim of the air-ship builder in fancy and in fact. The forms suggested have been multifarious in detail but alike in the general feature of supporting the vessel and its load by the levity of a gas, or of a vacuum, confined in a receptacle of sufficient displacement. All such actual efforts have invariably failed of satisfactory results, and practically speaking must fail of useful accomplishment with any form of propelling engine or known source of power because of, leaving out other grave mechanical difficulties, the enormously disproportionate relations between the supporting and the supported parts of the apparatus.

A successful commercial machine of this sort must necessarily possess the power within itself to advance in the teeth of winds at a rate greater than their velocities, and as the motor at such times must work upon the receding air the reserve and the waste of power must be enormous. Each increment of weight to engine or fuel involves a corresponding increase of displacement in the supporting part and a still greater ratio of increase in its resistances, and the conditions of *reductio ad absurdum* are soon reached. Attempts to overcome these restrictions have been numerous and futile, whether directed to the shape of the supporting part or to the adoption of new forms and applications of power, and, although unquestionably good and honest effort has sometimes been expended in this line of experiment, it has nevertheless come to pass that the man with a flying machine is in great danger of being confounded with the inventors of perpetual motions or transcendental motors. It is therefore not to be wondered at, and is in reality quite necessary, that Professor Langley in the introductory chapter of this memoir should lay much stress upon the essential and important difference between experiments in flying and experimental demonstrations "*of certain propositions in aerodynamics which prove that such flight under proper direction is practicable.*" "This being understood," he goes on to say, "I may state that these researches have led to the result that mechanical sustentation of *heavy* bodies in the air, combined with very great speeds, is not only possible but within the reach of the mechanical means we actually possess, and while they are not meant, as I have said, to demonstrate the art of *guiding* such heavy bodies in flight, they do show that we have now the power to *sustain* and *propel* them."

The experiments which are described and recorded and tabulated in the memoir with great minuteness and delicacy, were, generally speaking, made with the one specific object of elucidating the dynamic principles lying at the basis of the aerial mechanical flight of bodies denser than the air in which they move; they were extended also to the relation of propeller wheels used on some of the trials, and to measurements of power exerted and returned; they were in no way concerned with æronautics or the use of balloons or objects lighter than the air. Other than the propeller wheels just referred to, and which of course have only a secondary relation, the objects experimented with were thin vanes of wood (styled *planes* by Professor Langley), their surfaces being planes. These were of various dimensions, a representative size being one foot square and one-eighth of an inch thick; when necessary they were stiffened by strips of metal.

The purpose of the investigations required (1) that the planes should be caused to move through the air as if in flight, and at various inclinations and speeds; (2) that during such movements the resultant air pressures upon the planes, the position of their centres and their vertical and horizontal components should be accurately determined in each case; (3) that the relative times of falling vertically through a given space consumed by planes dropped when moving at different known horizontal velocities and at different angles of inclination should be exactly determined; (4) that the power required to drive the planes through the air at different velocities and inclinations should be accurately measured; (5) embracing all the above, that the observations should be automatically, exactly and synchronously recorded.

All of these experiments were made on a large "whirling table" 60 ft. in diameter, in the open air. This was caused to revolve horizontally at various speeds by a steam engine, and the planes were attached to or carried upon various forms of apparatus which could be substi-

* Experiments in Aerodynamics by S. P. Langley. Smithsonian Contributions to Science. Published by the Smithsonian Institution, Washington, 1891.

tuted for one another and attached in turn so as to revolve with the table. Space does not permit of detailed description of the apparatus, nor would it be possible to do so satisfactorily without numerous illustrations. For a full description the reader is referred to the memoir, it being only necessary to say here that both from the practical and the scientific point of view it has been admirably planned. The automatic recording appliances, under complete electric control and connected with the astronomical clock and chronograph of the Allegheny Observatory are especially noteworthy for precision and elegance; they are so disposed that each experiment records itself without human intervention and in indubitable harmony.

Before passing to a brief summary of the propositions which proceed from the results of those experimental demonstrations, it is to be noted that very careful investigation showed that, within the range of velocities given to the whirling-table, which was from 10 miles to 70 miles per hour (rim motion), whatever disturbing effects of air pressure arose from circular motion were negligible and that the precautions taken against other detrimental effects appear to have been ample to secure for the planes, in their various movements through the air, a very close approximation to the conditions of rectilinear motion.

We present here a brief synopsis of the summary of the experiments, as claimed by Professor Langley, in the form of propositions.

(1) That the stress, necessary to sustain a body in the air is less when in horizontal motion than while at rest.

(2) That this stress instead of increasing, diminishes with the increase of the horizontal velocity (a fact at variance with the conclusions of some physicists of repute and with ideas still popularly held)

(3) That it is at least probable that in horizontal flight up to great velocities the *greater the speed* the *less power* required to maintain it, this probability being already indicated by the illustrative experiment, while demonstrative evidence follows later. (See memoir, appendit *B.*)

(4) That the pressure on an inclined square plane moving through the air is normal to the inclined surface, and hence the effects of skin-friction, viscosity and the like are negligible in such experiments. It is also shown that for the small angles most used in actual trials of the plane the pressure on it is about 20 times greater than that assignable from the theoretical formula, derived from Newton's discussion on this subject in the *Principia*. This last experimental result is not presented as a new contribution to knowledge, since it had previously been obtained by experimenters in the early part of this century; but as their results appear not to have met with the general attention or acceptance they deserve, it is not superfluous either to produce this independent experimental evidence or to urge its importance.

(5) The time of falling of a horizontal plane is greater when moving horizontally than when at rest, and increases most notably with the velocity of lateral translation.

(6) By experiments with double planes one above the other it is shown that planes of advantageous shape do not interfere with each other at specified speeds if so placed at an interval not less than their length from front to back.

Passing over other minor conclusions not necessary for the purpose of this review, we come to the most important general inference from these experiments as a whole, which is that so far as the mere power to sustain heavy bodies in the air by mechanical flight goes, *such mechanical flight is possible with engines we now possess*, since effective steam-engines have lately been built weighing less than 10 lbs. to one H. P. and the experiments show that if we multiply the small planes which have actually been used, or assume a larger plane to have approximately the properties of similar small ones one H. P. rightly applied can sustain over 200 lbs. in the air at a horizontal velocity of over 45 miles per hour and still more at still higher velocities.

These numerical values are contained in the following table abstracted from the memoir, p. 66.

Data for soaring of 30 × 4.8 in. planes; weight, 550 grammes.

Angle with horizon α.	Soaring Speed v.		Work expend'd per minute.		Weight with planes of like form that 1 h. p. will drive through the air at velocity v.	
	Metres per sec'nd.	Feet per sec'nd.	Kilogram-metres	Foot lbs.	Kilograms.	Pounds.
45°	11.2	36.7	336	2,434	6.8	15
30	10.6	34.8	175	1,268	13.0	29
15	11.2	36 7	86	623	26.5	58
10	12.4	40.7	65	474	34.8	77
5	15.2	49.8	41	297	55.5	122
2	20.	65.6	24	174	95.0	209

It is not claimed that the relations of power, area, weight and speed, here experimentally established for planes of small area will hold for indefinitely large ones, but that from all the circumstances of the experiment there is no doubt that they do so hold far enough to afford assurance that we can transport (with fuel for a considerable journey and at speeds high enough to make us independent of ordinary winds) weights many times greater than that of a man.

In this mode of supporting a body in the air it is claimed its specific gravity, instead of being as heretofore a matter of primary importance, is a matter of indifference, the support being derived essentially from the inertia and elasticity of the air *on* which the body is made to rapidly run. The most important and, it is believed, novel truth already announced, immediately follows from what has been shown, that, whereas in land or marine transport increased speed is maintained only by a disproportionate expenditure of power, within the limits of experiment in *such aerial horizontal transport, the higher speeds are more economical of power than the lower ones.*

The results of these physical demonstrations cannot fail to be of interest and value both to scientists and to practical men who wish to discern the basis of reasonable expectation of ever seeing "the universal road of the all-embracing air traveled in every direction."

Professor Langley is always careful to separate the field of his experiments in aerodynamics from that of aerodromics which must be explored before this, as yet inchoate, art shall crystalize into a practicable scheme of etherine transportation; but it may be interesting to note his personal views on the latter point also, which we quote from a popular article on "Possibility of Mechanical Flight," prepared by him subsequently to the publication of the memoir, and which appears in the September number of the *Century Magazine.*

"If asked," says he, "whether this method of flight will soon be put in practice I should have to repeat, that what has preceded is matter of demonstration, but that this is matter of opinion. Expressing then, a personal opinion only, I should answer 'Yes.' It is hardly possible that these secondary difficulties (of guiding and alighting) will not be soon conquered by the skill of our inventors and engineers whose attention is already beginning to be drawn to the fact that here is a new field open to them. . . . "

Railroads in New South Wales.

An abstract of the Railway Commissioners' report for the fiscal year ending June 30, 1891, made to the Legislative Assembly of New South Wales, is published in Sydney papers. The total length of line open is 2,182 miles, with 153 miles under construction. Total cost per mile, $72,800; gross revenue per mile, $6,815. Working expenses were 61.5 per cent. of receipts, the net revenue being sufficient to pay 4.11 per cent. upon the debentures outstanding, or 3.6 per cent. upon the total cost. The engines ran an average of 19,100 miles each in revenue trains. The earnings per train mile were $1.70, and the expenses $1.04. Average charges for freight and passengers are not stated. The quantity of wool carried was 589,545 bales, the sheep depastured on Jan. 1, in the colony being 55,986,431.

	1891.	1890.	1888.
Total spent in construction and equipment	£31,768,617	£30,555,123	£27,722,748
Total debentures finally paid off	£1,139,175	£1,109,075	£1,017,875
Total cost of construction and equipment, less debentures paid off	£30,629,442	£29,446,048	£26,704,873
Total cost per mile open for traffic	£14,550	£14,003	£13,114
Total mileage open for traffic	2,182	2,182	2,114
Average miles opened for the year	2,182	2,177	2,044
Gross revenue	£2,971,421	£2,633,086	£2,295,124
Working expenditure	£1,831,371	£1,665,835	£1,530,551
Profit on working	£1,143,050	£967,251	£764,573
Percentage of working expenses to revenue	61.57	63.26	66.69
Earnings per average mile open	£1,363	£1,209	£1,122
Expenditure per average mile open	£839	£765	£748
Gross earnings p'r train mile	84.88d.	78.90d.	82.34d.
Expenses per train mile	52.26d.	49.91d	54.91d.
Net profit per mile	32.62d.	28.99d.	27.43d.
No. of passenger journeys	19,037,760	17,071,945	15,174,115
Goods tonnage	3,686,998	3,680,718	3,331,671
Live stock tonnage	115,851	108,232	68,101
Train mileage	8,410,421	8,008,826	6,689,313
Locomotives, number of	439	439	428
Passenger stock, number of	1,023	1,054	1,039
Goods stock, number of	9,940	9,304	8,833

The roads have suffered from floods, strikes and labor troubles generally. All the lower ranks of station and night officers have received increased pay; so have the salaried clerks and officers in all departments. Total increase in those departments during the year, $145,000. The holidays given to the staff during the year cost the colony $315,000. New lodging houses for drivers and guards have been erected along the lines, costing $50,000; attendants to look after houses, bedding, etc., cost $7,180. There are also provident and pension funds. Strikes last year cost the company $150,000.

The old lines were laid with 70-lb. iron rails and 56-lb. chairs when chairs were used. The new lines are receiving 80 lb. steel and 40-lb. chairs, the old material being put in sidings. Ironbark is used exclusively for ties. Blocking is being extended rapidly, and within three months the whole of one of the main lines, 386 miles, will be under the absolute block system. 80 per cent. of stations and sidings along this main line have points and signals interlocked. Tyer's tablet and Webb & Thompson's electric staff instruments have been ordered to be applied to the whole of the lines having much traffic. Through trains have electric communication between passengers and guards.

The Government has adopted the Westinghouse automatic brake and will urge forward the fitting of the stock rapidly. The Commissioners have cut down the rates charged on construction material for branch lines, and recommend that where the country is level and traffic light new and needed branches be constructed costing only about $8,750 per mile, exclusive of bridges and land; the trains to be run at about 15 miles per hour and in daylight only. Later on these light lines to be improved through a vote granting more capital.

The passenger coaches are now first class, but goods wagons are far from what they should be and will require large expenditures. The commissioners recommend an expenditure of $100,000 to take out four bad grades. The most severe grades are near Sydney and all the traffic passes over them. There are 25 miles of grade 1 in 30 and 185 miles of 1 in 40. A condensed statement for three years is given herewith.

A general summary of accidents on English railroads is made by an officer of the Board of Trade annually, being substantially a condensation of the principal facts shown in the quarterly reports, which are noticed periodically in the *Railroad Gazette.* This summary for the year 1890 has just been issued. It is compiled by Mr. Courtenay Boyle, and gives condensed narratives of all the more important train accidents. It is a striking fact that, with the immense train mileage of the roads of the United Kingdom, carrying, as they did, 817,000,000 passengers in 1890, exclusive of season ticket holders, only six train accidents were attended with fatal results to passengers; and there were only five others in which employés were killed. The proportion of passengers killed from causes beyond their own control was 1 in 45,430,224. This computation excludes the season ticket holders. The number of train accidents inquired into by the inspectors of the board was only 53, which is less than in any year since 1875, the average number of investigations per year for fifteen years being 101.

The classification of causes of the principal accidents shows 42 out of 53 to have been due to negligence, want of care or mistakes of officers or servants, although many of them were due partly to causes classed under other heads. The number of accidents due to inadequate or unsuitable brake power has gradually diminished from 47 in 1880 to three in 1890, and those from defective arrangement of signals or switches, etc., have dropped from 20 in the former year to six in 1890. The number of employés killed in coupling and uncoupling was 16, and in all switching operations, including these, 129. The fatalities in coupling have decreased about 50 per cent. from the average for the five years previous to 1886, notwithstanding a large increase in the mileage of road and of trains. Great Britain is not entirely free from the evil of highway grade crossings, and the Board of Trade has taken action in a number of cases brought to it by reason of the occurrence of accidents at such crossings. In most of the cases the Board has no power to compel changes, but the construction of footbridges or subways has been secured in nine instances. If it had not been for the collision at Norton Fitzwarren, Nov. 11, the train accident record for 1890 would have been exceptionally favorable.

The President of the New York Produce Exchange, who has transmitted to the Interstate Commerce Commission certain complaints of overcharges and other irregularities, publishes the following extract from a letter which he has received from Secretary Moseley:

From conversations had with merchants of New York, Boston and elsewhere, it seems that overcharges for transportation of freight by railroad, the long period which generally elapses before settlements are secured, and the difficulty of fixing the responsibility on the particular carrier where merchandise is moved over several roads, are more annoying and are felt by shippers a good deal more than individual preferences—if any such now exist. The suggestion has been made that the Commission take some action in an endeavor to reduce to a minimum this annoyance attending the settlement of overcharges and the fixing of responsibility.

To illustrate: A gentleman in New York told me some time ago that he had 200 bales of cotton shipped to him from Texarkana, that the freight was agreed upon, as well as the route by which the merchandise would reach New York. The cotton reached New York by five or six different routes, being broken up in some instances into lots of less than ten bales. On its arrival he was compelled to pay the carriers who delivered the cotton the back charges which they had advanced to other lines to get the cotton, though the sum of the charges aggregated more than the agreed rate, and that not only had he been two years endeavoring to fix the responsibility and collect these charges, but that he had also lost three bales which he had never been able to obtain any pay for. This must be an exceptional case. Still, I believe that this difficulty exists to a greater or less extent. . . .

It is true that the case cited is somewhat exceptional, but every claim agent knows of scores of them, if he has not at least one score pending in his office now; and the more important fact is that cases nearly as bad as this are so numerous that they cannot be called exceptional. But what to do about it is a pretty hard question to answer. Railroads ought to see, without being told by the Commission, the desirability, from their own standpoint, of not only promptly settling all just claims (and also quickly finding out what claims *are* just), but of effectively aiding consignees in getting prompt settlements from connections; but they do not, and no one has yet invented a form of appeal that has much effect on them.

"The Long Island and Eastern States Line," which is the name of the new line between New York and Boston, heretofore noticed in these columns, announces

that a through night train will be put on next Monday, to run every night in the week, and that a day train will be added later. The trains start at 11 p. m., and the time through between Long Island City and Boston is eight hours, equal to 31½ miles an hour, including the boat transfer, which will occupy from 45 to 60 minutes. The time on the railroads will have to be about 34 miles an hour. As the train will doubtless be light and the stops few, this can easily be made. The fare through is $5, the same as by the old lines from New York. As compared with these the new line is at a disadvantage of about one hour in time. As compared with the Sound steamers it has an advantage of about six hours in time, but a disadvantage of $2 in fare. For people living in Brooklyn, of whom it is said there are a good many who travel to Boston, the new line offers a little better time than those from the Grand Central Station. A special train with invited guests was run from Boston to Brooklyn on Wednesday, which was scheduled at 7 hours 20 minutes, through; but it was delayed two hours by defective arrangements at the boat transfer. Another excursion to exhibit the line was run from Brooklyn (Long Island City) on Thursday. The length of the line, according to the time tables in the Official Guide is 251 miles, as follows: Long Island City to Oyster Bay, 33 miles; Oyster Bay to Wilson's Point, 14; Wilson's Point to Hawleyville, 30; Hawleyville to Boston, 174 miles. The distance between New York and Boston by the Springfield line is 234 miles, by the Shore Line 232, and by the Air Line 213.

The September report of the Department of Agriculture makes a reduction in the condition of cotton during the past month of six points, from 88.9 to 82.7. The cause of the reduction on the Atlantic Coast has been an excess of rainfall, causing overgrowth of the plant and diminishing the tendency to fruitage. From Alabama westward drought was the main factor of loss, assisted by the boll worm and caterpillar. The condition is lowest in Arkansas, Louisiana, and Tennessee.

The condition of other crops is: corn, 91.1; wheat, 96.8; rye, 95.1; oats, 90.7; barley, 94.3; buckwheat, 96.6. A small advance is noted in all, buckwheat alone excepted. The average for potatoes is 94.8; for tobacco, 87.4. The condition of corn is 21 points higher than in September of last year, and has been exceeded only three times in the last 10 years. State averages are generally high; the lowest are those of Michigan and Wisconsin. The crop is in fine condition in the Southern states. It is not so much injured by heavy rains as cotton. A fine yield has been made west of the Mississippi, though in Western Texas a little reduced by drought. It is above medium throughout the South as a whole. In the Ohio Valley corn is heavy in stalk, somewhat late in earing from cool nights, but generally promising.

The condition of wheat is very high, considering both winter and spring varieties, in soils, latitudes and elevations widely differing. The general average has been exceeded only slightly twice since 1879, in 1882 and 1884.

The Baltimore & Ohio mechanical department is making tests of the hauling capacity of all the different designs of locomotives on the different divisions. The object is to furnish a rating of the locomotives on a definite basis, independent of local opinion, and of the statements of trainmen. This movement has met with some opposition already on the part of brakemen and conductors. The tendency of the men is to take as few cars as possible, and in some cases where it has been shown that the loads can be increased from 20 to 25 per cent., the brakemen have asked for more men to handle the trains. This demand has not been conceded, however, and hereafter the train loads will be in proportion to the rated hauling capacity of the locomotive as determined by a careful test. At present the tests are being made in the vicinity of Chicago, on the Chicago Dvision, with a Pittsburgh 10-wheeler, weighing 90,000 lbs. on the drivers, and having 19 × 24-in. cylinders, the total weight being 112,000 lbs. The maximum load of this engine thus far, at an average speed of 25 miles per hour, up a six-mile grade, 29 ft. per mile, is 1,260 tons. This load is considerably greater than has been ordinarily hauled by the engines. Undoubtedly this movement will result in decidedly increased train loads over the entire Baltimore & Ohio system.

The time is near at hand when the advocates of the two-cylinder and four-cylinder types of compound locomotives will have a chance to talk facts. The battle-ground will be on the Lehigh Valley Railroad that road, having ordered two compound engines of comparable design, one from the Baldwin Locomotive Works having the Vauclain cylinders, and one to be built from designs furnished by Mr. F. W. Dean, which is a two-cylinder engine. The four-cylinder engine is to be like the other Vauclain engines which we have frequently described. The two-cylinder engine will have the Dean starting gear of the latest pattern, which is a simpler device than other intercepting valves except, perhaps, the Von Borries, and the valve lifts vertically, which is a point in its favor. The Lehigh Valley road is good ground on which to show the relative merits of the two different kinds of compounds. From present indications, it is evident that the committee appointed by the Master Mechanics' Association to report on compound locomotives will have a vast amount of material to digest and to present to the Association, and we may look next year for a report of great value.

The Georgia Southern & Florida, a new road from Macon, Ga., southward to Palatka, Fla., has adopted the zone system, making its passenger rates three cents a mile for distances under 50 miles, two and a half cents for distances under 100 miles and two cents for those over 100 miles. The company will doubtless get a good bit of free advertising by this, as the zone system has tickled the newspapers of this country more than any similar novelty for some time; but the practical benefit to the people of Georgia is somewhat doubtful, for it is said that the low rates put in effect by this system apply, so far as local business is concerned, only between stations where the population is so small that there can be but little travel in any event. The only important reduction is that between the termini of the road, and this has been met by the unanimous refusal of all connecting and competing lines to sell through tickets over the new line.

Last spring we were able to announce, from private advices, that there would probably be an extension of the China Railway Company's line northeasterly toward Manchuria, as the result of an examination of the country by Mr. Kinder and others nearly a year ago. The United States Minister to China, in a dispatch dated Peking, July 28, 1891, says that an imperial decree has been issued sanctioning the extension of the railroad from Liu Hai to Shan-Hai-Kuan. Liu Hai is the present terminus of the road, which runs from Tongshan, near Taku, on the Peiho River, to the Kaiping mines. Shan-Hai-Kuan is a city on the Gulf of Lioutung, at the terminus of the Great Wall. The road, he adds, will ultimately go to Moukden, the capital of Manchuria, touching probably Neuchwang. Tenders are invited for an iron bridge 2,100 ft. long over the Lan River, north of Kaiping, and bids have been solicited in the United States.

The Chicago Belt Line one day last week transferred 13 miles of freight cars, 2,200 in all, over 16 miles of track. The operation of this road is one of the curiosities of Chicago. There is in contemplation a trip over this system by a party of master car builders and master mechanics before long to observe the operation, means of handling cars and the difficulties incident to the wide variation in cars and loading.

It is reported that the Old Colony compound engine has shown a saving of 50 per cent., and in some cases 60 per cent., over the simple engines on the Old Colony railroad. Now, while we are enthusiastic regarding the possibilities of the compound system, yet in this instance we feel like asking what is the matter with Mr. Lauder's simple engines?

The Pacific mail steamer China reached San Francisco on Sunday last in 12 days, 11 hours, 55 minutes from Yokohoma, this being the best time on record. The officers say that they used only a trifle more coal than usual, and make disparaging remarks about the excessive cost of the fast trip of the Empress of Japan to Vancouver a fortnight ago.

Chairman Walker, of the Western Traffic Association, has authorized the following statement: "In reference to the rubbish now afloat connecting my name with the Interstate Commerce Commission vacancies, I would like to say distinctly that I am not a candidate for the position, and do not consider the suggestion worthy of serious consideration."

NEW PUBLICATIONS.

A Treatise upon Wire, its Manufacture and Uses. By J. Bucknall Smith, C. E., London: Office of *Engineering*; New York: Jno. Wiley & Sons. $3.

The preface to this valuable work states that it "is intended to convey to the average reader, intelligible and practical discriptions of the history, manufacture and uses of various kinds of plain and worked wire, as concurrent in, or applicable to, innumerable industries and purposes of daily service to all classes of the community." It is elementary in character, and treats the subject with a practical subordination of the commercial interests involved.

The introductory chapter gives a very interesting historical sketch of the development of wire manufacture. The oldest known specimens of wire in existence date back to 1700 B. C., but the first record of the "drawing" of wire is found in the histories of Augsburg and Nuremberg, dated 1351 and 1360 A. D., where the term "drahtzieher" (wire-drawer) is used. Statistics are given of the many uses of wire, also of the enormons increase in value of the material when manufactnred. For example, small fish hooks are worth some $27 per pound, and the hair springs of watches are worth 160,000 times their weight in steel. The principal part of the book is divided into two sections, Section I. treating of "The Manufacture and Uses of Wire," and Section II. of "Worked Wire and its Applications."

The first part of Chapter I. is a disquisition on the several kinds of steel used, their chemical composition, etc. This is very elementary in character but has a bearing on the question of use. The statement that "the more precious metals and finer wires, are commonly manipulated through drilled stones or gems" needs modification, as it is not true respecting the greater portion of the gold and silver wire that is drawn. The statement that "steel containing under 3 per cent. of carbon is commonly considered mild," is undoubtedly an error in proof reading.

Cuts are given of mills for rolling wire rods, of wire drawing machines, annealing furnaces and tempering bath, of galvanizing plant, testing machines and straightening machines, all of which will be new to a large class of readers.

The statement, "for the present, the manufacture of high qualities of steel rods and wire is not much attempted in the United States," must be questioned. The wire for the East River Bridge was of American make in competition with English. It had a breaking strength of 160,000 lbs. per sq. in. of section with an elongation of 4 per cent. on 5 ft. in length. Since that was made the manufacture of high grade wire has been largely extended, and is now carried on at several immense establishments.

The second chapter treats of wire made from other metals, such as copper, bronze, silver, gold, piatinum, brass, delta metal, etc. Considerable space is given to a discussion of the valuable qualities of silicium bronze wire for telegraph purposes. It is now made with a conductivity 97 per cent. of that of copper, and a tensile strength of 30 tons per sq. in. of sectional area.

One of the remarkable statements made is, that a rod of silver covered with 24 grains of gold has been drawn down to a length of 140 miles without the silver being uncovered at any point. Such wire is drawn first through steel dies, and afterward through drilled rubies, sapphires or diamonds. A specimen of careless writing occurs here in the statement that "silver ingots are refined or 'grained' by melting and pouring into water, by which it assumes a granulated form, etc." The actual *refining* is a chemical process, for which the granulation is only a preparation.

Chapter IV is a very valuable description of the use of wire for the conduction of electricity. It contains full tables of the relative conductivity of the various metals, of the requirements of the British Postal telegraph authorities as to weight, tensional and torsional strength, the proper tension and "sag" to be allowed at different temperatures in erecting telegraph lines, &c.

The second section opens with the subject of wire ropes, of which the first were made in Germany about the year 1821. The latest patented forms of rope are quite fully treated, and the scientific requirements of a good rope are clearly stated. A large number of rope laying and cable making machines are illustrated. Extended reference is given to experiments made at the Forth Bridge on the use of wire ropes. The author holds the opinion "that for wire ropes employed for running around pulleys, the component wires and strands should all be laid in the same direction." The tensile strength of the individual wires was found to be about 10 per cent above that obtained in the form of roping. Attention is called to the importance of the lubrication of wire ropes as increasing their life from two to five times that when unlubricated.

Full tables of sizes, weights and strengths are given. A discussion follows of the several systems of rope haulage, with illustrations and details of grip cars, and hauling engines, of aerial rope ways, gripping apparatus, etc.; of street cable railroads; of crane and hoisting ropes; use of ropes in bridge erection; and of their use in transmission of power.

The next subject treated is wire netting and woven fabrics, with illustrations of the machinery required. As a digression there is then given a description of the new process of "expanded" metal making, which takes the place of wire netting.

The volume closes with a fully illustrated description of the several kinds of wire fencing with the methods of erection, of horticultural wire work, and wire nails.

The method pursued by the author is very discursive, as when he occupies a full page to a notice of Mr. Newall, one of the first to invent wire rope machinery, also when he gives lengthly descriptions of various wire working establishments as to points which are not essential to his subject.

The several elementary treatises too on the ores and manufacture of metals might well be omitted for the sake of compactness.

Progressive Examination of Locomotive Engineers and Firemen; By John A. Hill. New York: John A. Hill, P. O. Box, 1736. Price 50 cents.

This is a convenient pocket book, 4 × 6 in., bound in flexible cloth, containing 75 pages of profitable reading matter for engineers and firemen concerning their duties. There is an excellent chapter on selecting the right men for firemen in the first place, followed by three chapters of questions and answers for examinations, to be taken after one, two and three years' service respectively. The first examination is as to the man's fitness as shown by his work, and on his knowledge of the rudiments and of signals. The second covers combustion, boilers and firing, and the third takes up the mechanism of the engine and of brakes, and tests the man's skill in meeting emergencies, such as breakdowns, etc. The latter part of the book contains diagrams showing the manner of using signal flags and lights on the head and tail ends of trains in accordance with the

standard code of the American Railway Association (Time Convention).

Mr. Hill is the creator and editor of the *Locomotive Engineer*, and this catechism on the duties of locomotive firemen and engineers was lately published in his paper. The term progressive is used to indicate the threefold character of the catechism. The first chapter is easy, the next harder, and the last is the most difficult.

Mr. Hill has the two essential qualities to do a work of this class in the best manner. He has served ten years on a locomotive, and he knows perfectly how to tell things in such a manner that the dullest mind (and therefore all minds) can comprehend them. This last gift is of the highest importance in a work of this kind, for practically all instructors of enginemen either lack it entirely or else have not the time and patience to use it. This book might not promptly meet with the formal approval of a sedate and dignified board of directors, for the author's language is characterized by that free use of the idioms of the people so familiar in his other writings. But we understand that several prominent roads have already made more or less use of the work (whether the directors regard it as sufficiently colorless and dignified or not), and we are sure that their action cannot have other than good results.

We are not sure that every question in the book is in precisely the best form, and it may be that some of the answers could be improved. Moreover, many of the subjects could be greatly amplified, much to the benefit of the student; but railroads generally are not yet ready to use a perfect book, if one could be made, and practically this work is "all right." Hardly any master mechanic can fail to find in it a good many points which he himself has either omitted or has embodied in a less desirable form. Mr. Hill evidently was a good runner, and he tells his readers in very plain language the most essential things necessary to enable them to imitate his example. The reader is not only posted on the technical duties of his "profession" but is favored with some very practical hints such as never appear in an official document. The author tells him to do disagreeable work with as little "kicking" as possible, and to avoid the reputation of being "fly" on the road; that lying to save a man's job is almost sure to be unsuccessful in the end, and that to succeed one must not only "keep up with the procession," but must always "tell the plain, naked, bald-headed truth." It is true that every fireman can learn street language fast enough from his associates, but if the expressiveness of this feature will aid in disseminating the useful information in this book, the most austere superintendent can afford to tolerate it. At any rate, we advise every fireman and every boy who wants to be an engineman to buy and read the book.

A Treatise on Wooden Trestle Bridges, According to Present Practice on American Railroads. By Wolcott C. Foster. New York: John Wiley & Sons, 1891. Pages 160; 9 in. × 6 in. Index and numerous illustrations. $5.

Readers of the *Railroad Gazette* already know a great deal of the contents of this book, as many of the special structures treated in it were published in our pages, by agreement with the author and publishers. A great many examples of trestle structures are given and carefully illustrated in general and in detail. Dimensions are figured on the engravings and are also tabulated with each example. The result is a book the like of which does not exist in any language, and which is often called for by practicing engineers and also in technical schools. The author's industry, zeal and enterprise will be gratefully acknowledged by numerous readers.

The Rivers at Johnstown, Pa.—Report to the Board of Trade of the City of Johnstown by J. J. R. Croes, C. E., June 15, 1891. 8 vo. pp. 32 with maps and 32 illustrations. Price $1. Sent postpaid on receipt of price by the *Railroad Gazette*, 73 Broadway, New York City.

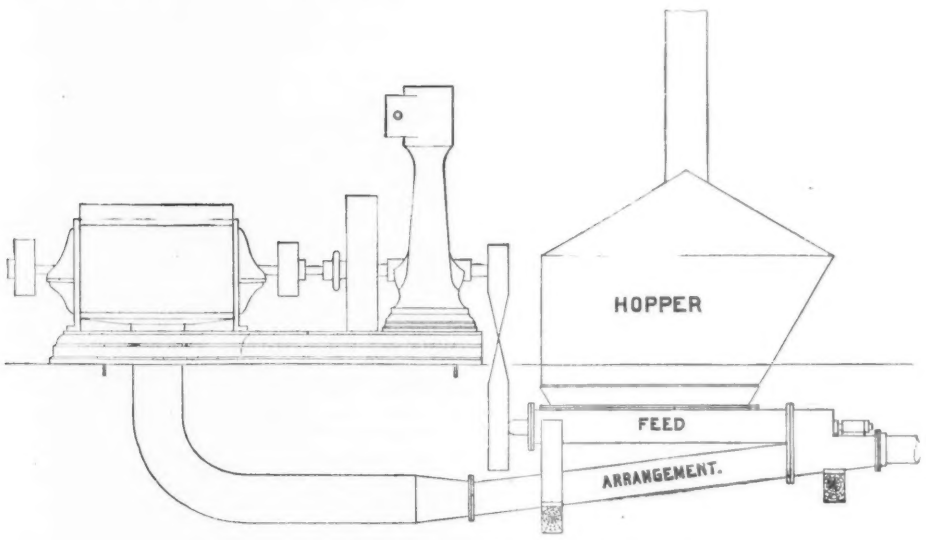
This report, the submission of which to the Johnstown authorities, and their action on it were noticed in our columns at the time, is here presented in very attractive form, with illustrations, from photographs of the localities alluded to in the text. With the aid of these views, which are very artistically reproduced, the statements and recommendations of the engineer's report, which in itself is clearly and concisely expressed, can be followed and understood by any one, be he engineer or layman.

Moving Slack Coal by Blowing.

A new use for the Root blower has been found in the removal of slack at coal mines and shipping localities. The plant consists of a Root, positive blast blower and an operating engine or belt in connection with the slack hopper, an attached worm discharge for the slack, and a blast pipe connected with the worm discharge.

The worm discharge from the hopper is operated by a belt from the engine, and is adjustable to move only such an amount of slack as can be taken care of by the blast. The operation is upon the same principle as the sand blast for file cutting and sharpening, and the maximum capacity of the plant can readily be determined. The method is clean and economical, and shows a saving of from six to eight dollars a day over cart or car and horse practice.

It can be used for the removal and collection of dust and refuse from ore concentration works, and for similar purposes. The refuse through the use of conveyor pipes can be discharged at any desired spot or locality.



PNEUMATIC APPARATUS FOR MOVING SLACK COAL.

By the P. H. & F. M. ROOTS COMPANY, *Connersville, Ind.*

Street Railroads in Holland.

For several years past steam railroad systems have undergone rapid development in Holland, attributable mainly to the circumstance, mentioned by the Austrian *Eisenbahm Zeitung*, that practically no restrictions are placed in that country on the building of such roads. The gauge ranges between 0.75 m. and 1.435 m. (2½ to 4.7 ft.). In the earlier days of the roads there was considerable variety in the character of the permanent way, but after 10 years' experience the T rail, laid on wooden or steel cross ties, has been generally adopted. Longitudinal ties are used only in isolated cases. As a rule, there is only a single track, and there are no station buildings, properly speaking; there being only locomotive and car sheds, office buildings and workshops. In the cities horse traction is used, but in suburban and country districts steam locomotives are almost exclusively employed.

Occasionally locomotives are used in city streets, but they are then of a special type, the running gear being all closed in and special devices being adopted to prevent smoke. In some places there is an ordinance requiring a man to walk ahead of the locomotive in narrow streets and give warning of its approach. The necessity for this becomes apparent from the statement that at some points the clearance between the locomotives and houses is not more than a few inches. The locomotives are generally managed by only one man, who performs the office of both engineer and fireman; but there is now a movement on foot intended to compel the companies to have on each engine both an engineer and a fireman. The highest permissible train speeds on the various lines is limited to about 12 miles per hour, but this limit is rarely reached.

At the beginning of 1890 there were in the whole country 47 street railroad companies with 875 kilometers (about 543 miles) of road. Of this length only 55 kilometers (about 34 miles) had double tracks. Thirteen of the companies used only horses for traction; 29 confined themselves to steam locomotives, while five used both horses and locomotives according to circumstances. There were in use altogether 213 locomotives, 1,023 horses, 802 passenger cars and 467 freight cars.

TECHNICAL.

Manufacturing and Business.

A trial order has been given to the New York Air Brake Co., to equip 50 new freight cars of the Chicago, Burlington & Quincy with automatic air brakes.

The administrators of the Campbell Frog & Crossing Works of Bucyrus, O., will sell the entire plant, buildings and shop tools, and railroad frog patents, at Bucyrus, Oct. 7.

The Dayton Mfg. Co. having made full settlement and purchased licenses is now exclusively authorized to manufacture and sell classification, tail or marker lamps, commonly known as "Blizzard," "Tornado" and "Utility" locomotive and train signal lamps, under the patents of Messrs. Huntington, Johnson, Armour, Gall and Madden.

Mr. A. C. Douglas, who recently completed two tunnels for draining the Ashland (Pa.) Coal Basin, has been awarded a contract by the Cataract Construction Co. for canal and other rock excavation at Niagara Falls. Mr. Douglas has recently begun putting in new Ingersoll-Sergeant piston inlet air compressors and Ingersoll-Sergeant drills. Rogers & Clements, the contractors for the main tunnel at Niagara Falls, have recently put in Ingersoll-Sergeant drills, and are making rapid and satisfactory progress.

The St. Louis Steel Foundry Co. has begun the manufacture of open hearth basic steel by the Siemens-Martin process at its new East St. Louis plant.

Messrs. Byram & Co., of Detroit, exclusive manufacturers of the Colliau patent cupola furnace, have recently made shipments of the cupola furnace to Cardena, Cuba; San Luis Potosi, Mexico, and Yokohama, Japan.

The C. W. Hunt Co., 45 Broadway, New York, has shipped to Tampico, Mex., a large steam shovel, with the elevator, engine and boiler, together with four portable automatic railroads, to the Monterey & Mexican Gulf road. The shovel is of two-ton capacity, and is for handling bituminous coal. The automatic railroads are to work in connection with the steam shovel.

The Allegheny City light plant, Allegheny, Pa., was erected under direction of the city councils, and is thoroughly Westinghouse in all its apparatus. The machinery comprises nine Westinghouse engines, three alternating current incandescent dynamos, nine alternating current arc dynamos and two direct current dynamos used as exciters, all made by the Westinghouse Electric & Manufacturing Co. The steam is supplied by six 100 horse-power Erie boilers, fitted with Roney stokers, operated by a Westinghouse engine, with another arranged as a reserve. The very limited space provided by the city required the exercise of the best engineering skill in order to put into use so extensive a plant in such narrow quarters, which was successfully accomplished.

Harrington's Manganese Bronze.

A bronze that has lately been brought out and teste in Pittsburgh has attracted considerable attention. I is sold by Thomas Harrington & Co., Pittsburgh, and is the invention of Mr. Harrington. It is a compound made by amalgamating iron, copper, zinc, etc., into a perfectly homogeneous alloy, possessing great tensile strength, density of structure and imperviousness to all acids except muriatic. Its color is that of red gold, but changes slightly under manipulation to a bright, high-brass color. It takes a beautiful polish with a brilliant lustre. It has not been tested so far with caustic soda—that is being done now—but it has shown very great resistance to sulphuric acid, pure and diluted, to sulphur water, and to waters possessing the alkaline character of sea water. Its tensile strength normally—by which is meant in a casting—is 60,000 to 65,000 lbs. per sq. in. This increases under manipulation, as with iron or steel, until when drawn into wire it exceeds 100,000 lbs. per sq. in. The metal is easy of manipulation, forges or rolls hot or cold, and is stronger hot than when cold up to 1,000.° It does not weld, but can be braised like brass or copper. In price it is about the same as ordinary bronzes a cent or two lower in quantity, but subject to the fluctuations of the copper market. While not yet prepared to furnish it in commercial quantities, the company will sell it in ingot only at 15c. per lb. for No. 1 and 13c. for No. 2, the only difference in the two grades being that No. 1 is made of all new material, while No. 2 is partly of old material.

The Amphibious Engineer.

The following notes are from a letter describing some of the experiences of the engineers on the Wilmington, Chadbourn & Conway Railroad, in North Carolina:

The swamp has a heavy growth of cypress timber, and a very thick underbrush in it, and from 2 to 12 ft. of water. In surveying the line the whole party had to go in dugout canoes. The first rodman and chainman were in one canoe, followed by the back chainman in another. The transitman had a man and canoe detailed to wait on him, and the back rodman always came up in one. It required one for every two members of the party, and the line of sight was extremely difficult. A great many peculiar devices had to be thought of for stakes and hubs, and setting up the transit, which are probably unknown to the engineering profession.

Part of the work is to be trestled. A powerful dredge is now making the embankment, which in places is 12 ft. high, 12 ft. wide on top, with a slope 1½ to 1, making a 50-ft. base. Strange to say, most of the material is coarse sand, and occasionally rock has been struck. Those who are interested in this kind of work would do well to see the dredge. It is a very powerful machine capable of handling the largest cypress stumps. The material brought up by the dredge is washed in place, and the bank dressed up by a stream of water from a hose and pump.

The World's Torpedo Boats.

The manifest weakness of the "Vesuvius" as a torpedo boat has left the United States in the rear for a time, and the New York *Sun* makes a comparison of that class of boats in other countries. Chili has in its late disturbance shown their value in the successful destruction of the ironclad "Blanco Encalada," by the torpedo boats "Lynch" and "Condell." The boats were built for a 20-knot speed, but attained on trial 21¼ and 20.3 knots per hour. The Argentine Republic has a pair of boats of 520 tons capacity and a 20 knot speed. All these boats were built by the Lairds, of Scotland. Spain has the

"Destroyer" of years ago, a vessel of 3,800 H. P. capacity and 22½ knots speed. Two vessels of 575 tons and slow speed followed the "Destroyer." Italy has built a number of torpedo boats, each with more or less success. The last one the "Partenope," finished in 1890, holds as good a reputation as any of its class. She has a displacement of 860 tons, with 4,300 H. P. and a 20-knot speed. She is armed with six torpedo tubes and has a rapid firing battery. Five similar vessels are now being built. England has a number of vessels varying in displacement and speed. The larger vessels range between 1,600 and 1,700 tons displacement and have 17 to 19 knots speed. Her smaller vessels range between 550 and 850 tons displacement, but all have over 19 knots speed. The tendency of English construction is increased strength of vessel and greater capacity of machinery for ocean and heavy weather efficiency. In France the "Condor" is the heaviest vessel, having 1,250 tons displacement and an 18-knot speed. She carries five tubes and five guns of good calibre. Of the smaller French sizes the Bombée is a leading type with 400 tons displacement and a 19-knot speed. As a result of experience with the Bombée class, two small boats of 45 tons were constructed. The main criticism of the Bombée class was that they were too lightly built for the service expected, still its general make-up and design has been quite carefully followed by most European countries. Germany started her experience with the purchase and fitting out of a high-speed English vessel of 975 tons, and having a pair of tubes, on trial she was almost a failure with her tubes, but attained a speed of 16 knots per hour. Two vessels of about 1,375 tons each and an 18-knot speed were then purchased and fitted out. Lately smaller sizes have been taken up. One, the "Meteor," of 950 tons displacement and good speed, was built, resulting in a display of weakness and lightness of construction for the work to be done. A set of smaller boats of from 300 to 450 tons and averaging the very high speed of 22 to 25 knots, and styled division boats, have proved quite successful. Four or five new vessels of 775 tons are being built. Austria, some years ago, built the "Zara" and the "Spalato," of 850 tons each, and two trial vessels after these, all of which proved too slow and too light. She then had a pair of vessels of 1,550 tons each built for torpedo service, and attained with them a speed of 19 knots per hour. These vessels are similar in appearance, usefulness, etc., to the United States vessel "Yorktown." Austria, however, has fallen in line with the other European countries and is building smaller vessels of 300 to 600 tons displacement and 20 to 23 knots speed.

A Healthy Locomotive.

In our issue of Dec. 2, 1886, we published a letter from "Charles Dickens" (engine No. 955), of the London & Northwestern Railway. This engine was built at the Crewe works, and turned out Feb, 6, 1882. At the time when it sent us that autobiographical notice it had run a total of 501,135 miles, making in four years and a half an average daily mileage of 362 miles. We now hear again from "Charles Dickens," through the vigilant correspondent of the New York *Sun*, who says that yesterday (that is, Sept. 12) the engine had completed its million miles. The engine has never had a breakdown. It runs daily from Manchester to London and back.

Car Heating.

Ten new passenger cars built by the Grand Trunk for use on the Toronto Belt Line have been fitted with the Morton steam heating system made by the Morton Safety Heating Co., of New York and Baltimore.

Foreign Railroads.

The Bureau of the American Republics, at Washington, D. C., is informed that 100 kilometers of the Paraguay Central Railroad, from Villarica to Yuti, was opened to the public on Aug. 9, and the inauguration of business was attended with great ceremony.

Canadian Cruisers.

The contract for the construction of a new steel cruiser for the Atlantic fisheries protection service has been awarded by the Dominion Goverment to the Polson Iron Works, of Toronto and Owen Sound. The new craft will be 127 ft. keel, 19½ ft. beam and 9½ ft. deep of hold; will be fitted with double compound engines, and is to have a speed of 15 knots. Four Canadian firms tendered bids; Polson's, whose figure was about $38,000, being the lowest. The same firm has now on the stocks a fine steel steamer for service on the Great Lakes.

Electric Yard Engine.

An electric locomotive is in use by the Lonsdale Company, at its extensive cotton mills in Lonsdale, R. I. It consists of a platform car and trucks having a 30 h. p. motor, with a trolley stand at one end, and at each end controlling devices, so that the locomotive may be moved both forward and backward. The locomotive is capable of hauling 30 tons and goods may be also placed on the platform of the locomotive itself. The length of the track over which the machine runs is 2,700 ft. the trolley wire being suspended some 16 or 18 ft. above the rails, and attached either to poles or to the adjacent buildings. Electricity is supplied from a dynamo operated by a water wheel.

The Day of High Buildings.

The latest announced design of sky-scraping building is one for an Odd Fellows' hall at Chicago. It is to reach a height of 556 ft. or one foot more than the Washington Monument. May we have the privilege of requesting that a more liberal overplus be allowed and the plans be altered to such an extent as to raise the stated height a foot or two, for should the building be erected in summer, there might be a shortage in winter, and the object not be attained. The addition of a single foot is not enough to keep the lead. The Odd Fellows' building is to have a main structure 14 stories in height, a square cross six stories in height is to rest upon this main structure, and finally a tower of some 14 additional stories in height is to cap the whole. The height to the top of the structure is to be, as stated, 556 ft. The cost is estimated at three and one-half millions. The ground to be covered measures 177 by 233 ft. In addition to the above announcement, there has been a rumor that M. Eiffel is to build a tower for Chicago, a leading feature of which is that it shall be a few feet taller than the one at Paris. We may, however, improve upon this last announcement by stating that outline plans have been made and the weights, strengths and estimates as to cost and time of building have long been in existence for a tower of 1,500 ft. height, or 500 more than the Eiffel. These estimates cover heights of 1,000, 1,250 and 1,500 ft. We fear, however, that there has been too great a delay for any such structures to be completed by the opening of the Columbian Exhibition.

THE SCRAP HEAP.

Notes.

An express car on the night express of the Central of Georgia was robbed near Savannah on the night of Sept. 11.

A colored man has been arrested at Muskogee, I. T., for stealing a carload of cattle and shipping them to Kansas City.

The Southern Pacific Co., after considerable negotiation, accompanied with some friction, has raised the price of erecting a combination car at the Sacramento shops from $40 to $45.

The railroad men of Fort Worth, Tex., to the number of about 150, have taken steps to form a railroad club. The membership seems to include men from all ranks, from superintendent to clerk and fireman.

The greenhouse of the Pittsburgh Division of the Baltimore & Ohio at Connellsville, Pa., which has been running four years, has distributed 18,000 plants this year. About 60 flower beds are supplied from this greenhouse.

Two hundred railroad employés, mostly of the Chicago, Milwaukee & St. Paul, met in Dubuque, Ia., last week, and organized a "Railroad Employés' Union." Their object is to oppose candidates favoring hostile legislation toward railroads.

The main building of the Youngstown Bridge Co., at Youngstown, O., was destroyed by fire Sept. 4, and the loss will be about $75,000, the insurance being $60,000. The office and valuable plans were saved. About 300 men have been employed. The works have been in operation two years.

The derailment of a Lehigh Valley locomotive near Kennedy, Pa., on the night of Sept. 9, by dynamite, proves to have been the work of a crazy man named Barrand, who has been in jail most of the time since 1878, having tried to blow up the steamship Drew in 1879, and wrecked a passenger train at Plattsburg, N. Y., in 1887. He has lately been living in extravagant style at a hotel in Bethlehem, Pa., assuming to be the chief engineer of a French railroad. He made a number of dupes among professional people.

The Lake Erie & Western Railroad, whose freight traffic was seriously interrupted a few weeks ago by a strike and again by the same men stopping work a few days after a settlement had been agreed upon, was again "tied up" on Thursday of last week in consequence of a strike of yardmen, who were supported by the trainmen, the latter refusing to work until the yardmen were satisfied. The strikers spiked switches and in various ways bothered men who were at work, and finally boarded a train five miles out of Lima, "killed" the engine and uncoupled all the cars. The reports indicate that the road finally got rid of the strikers and resumed the regular running of trains.

A Salt Lake City paper says that the following rule is in force on the Denver & Rio Grande:

Conductors will permit one or both their brakemen to read all train orders received by them when this can be done without detention or inconvenience. Enginemen will in like manner show their orders to firemen. Brakemen and firemen will be expected to read such train orders, for the purpose of acquiring information in the matter of running trains, in case they should at any time be called upon to perform such duties; and also that they may be prepared to promptly attend to their duties when required to take siding, or to meet and pass trains, or be passed at other than regularly designated time table points.

The Illinois Central seems to be in the lead at present in devising new schemes for advertising. The company has issued a pamphlet containing an elaborate essay, with facts and figures, on truck farming, which is designed to promote that industry along its line in the South; and the passenger department has taken the measures of the heads of the local ticket agents (to whom it is wicked to pay a commission) and will present each one with a new hat of a style agreeable to him. These gifts are to be sent on the recipient's birthday, and the traveling agents, in asking for the date of this event, have, we are informed, taken a record of the ticket seller's age. If any of these sellers are females we can see a rational connection between the age of the candidate and the style of the hat; but with ordinary conditions there would seem to be a little mystery in this part of the scheme.

The National Association of Local Ticket Agents met in St. Paul last week. The attendance was about 500, including members and their wives and friends. The membership of the association is now 647. The officers elected for the ensuing year are: President, W. H. Wallace, Philadelphia; Vice-Presidents, H. R. Day, E. F. Lackner and C. E. Stone; Secretary, M. G. Carrell, Cleveland; Treasurer, T. W. Vinemay. Executive Committee: C. D. J. Noel, of New York; Henry Lyon, of Missouri; C. W. Paris, of Ohio; J. A. Dart, of Ontario, and Thomas Dart, of Illinois.

After the convention a party of 260 went on an excursion to the Yellowstone Park, tendered by the Northern Pacific. The St. Paul & Duluth invited the delegates to go to Duluth. The Wagner and Pullman sleeping car companies tendered free use of their cars to delegates for return trips. The Great Northern gave the members an excursion on Wednesday to the State Fair Grounds.

Notes on the Last Week's Progress of the World's Fair.

The members of the National Commission have expressed satisfaction and astonishment at the amount of work accomplished recently. Nicaraugua has asked for one-half acre of space. The contract for the interior docking and pile driving in the grounds has been awarded to Messrs. Shailer & Schiglau for $162,970. A proposition has been sent in to the Ways and Means Committee offering $1,250,000 for the privilege of having bull fights on the Exposition grounds. The proposition has been refused. The South Park Commissioners have refused to lease ground for the location of a tower beyond the period of the fair, and the projectors of the tower declare that they cannot afford to invest $1,000,000 for so short a season. The National Commission has asked the United States government to detail an engineer to inspect the World's Fair buildings during construction. The Director-General has been solicited to appoint a woman for the chief of the live stock department. Two granite columns for the Woman's Building were contributed by the lady manager of Washington. The columns will be 15 ft. high, 20 in. in diameter, and will be placed in the main entrance on the east side of the Woman's Building. The Grounds and Buildings Committee advertise for the construction of a building to accommodate five saw mill plants. The structure will be placed south of the Agricultural Annex, on piles driven in what is now a natural lagoon. The building will be 130 × 200 ft.

Proposed Improvements in Chicago.

The Mayor of Chicago and the Commissioner of Public Works are starting a plan for the utilization of the lake front south of the Chicago River. Those who are familiar with that city know what a nuisance it is to have the entire front of the lake and the most beautiful part of the city wholly cut off by reason of a trunk railroad with from 12 to 15 parallel tracks running down what should be a beautiful and accessible beach. At the present time there are several points on the lake front where there are objects of interest, and steamer landings which are accessible only by crossing the tracks at points where the crossings are not protected by flags and gates. The most notable of these is at the Van Buren street station opposite the lake front park, and also opposite the Auditorium. There is at this point a long steamer landing where excursion steamers from the north and south park systems land passengers, who are compelled to cross about sixteen tracks to reach the park, and no reasonable provision is made for their safety. The steamers now running there are ordinary ones, and the class of people who patronize them are that class who will take any risk for "a good time"; but it is generally believed that if a safe provision was made for crossing the tracks a better class of people and visitors generally would take advantage of excursions to Lincoln and Jackson parks and that there would be local steamer lines to Evanston and South Chicago. In fact, several corporations have signified their desire to put on first class steamers for these excursions if a safe landing could be found for their passengers. The Mayor's present proposition is to build several viaducts over the Illinois Central tracks at this point, and to meet the cost of this by charging a license fee from the excursion craft that ply in the waters of the harbor, including the sailing craft as well as steamers. There is little hope of getting the Illinois Central to lower its tracks, and in view of the fact that there has been more than 200 per cent. increase in the passenger traffic from the lake front to the parks since the commencement of the World's Fair construction, it is deemed important to furnish some satisfactory landing for the further increase which will occur in the next two years and during the time of the World's Fair.

The Mayor has another scheme also on foot; it contemplates building up the city and reducing the taxes by deriving a benefit from the lake front basin. Those who are familiar with Chicago will remember that there is a large harbor opposite the lake front park, which, if filled in, would furnish an immense building ground for business purposes or for dwellings; it would be desirable for either. It is estimated that the earth to fill in the basin can be secured by excavating subways under the principal streets for the sewers, gas pipes and telephone and electric light wires, and also by pumping the sand from the shallow portions of the lake. It is supposed that the rentals of the ground secured in this way would shortly pay for the entire cost of filling, and would, therefore, furnish a revenue to the city sufficient to pay for a large amount of other improvements, but this last is speculative.

The Illinois Central Chicago Station.

The competing architects now working on designs for the new passenger station for the Illinois Central will work under the following restrictions fixed by the company: The building will be nine stories high, the upper floors being designed for the general offices of the road. It will be erected at the southeast corner of South Water street and Central avenue, 150 ft. on the former by 185 ft. on the latter street. South of the station the train shed will extend 500 ft., with a span of 150 ft. The tracks will number 11. J. F. Wallace, the company's engineer of construction, will supervise all work of an engineering nature. The main floor of the station will be approached from Central avenue, with a carriage entrance leading from South Water street. The main exit will be at Lake street, to which point the station will extend. The building will cost about $1,000,000. The architects who are working on drawings have only until Oct. 1 to send them in.

Wrecks.

A passenger train on the narrow gauge line of the Union Pacific was wrecked near Beaver Brook, Col., on the 13th, while running rapidly around a curve. The cars fell down a bank, and 26 passengers were injured, of whom it is said that five will probably die. No cause for the derailment is given, except that the train was probably running too fast. At Atchison, Kan., Sept. 10, a small foot bridge at the fair ground broke under a crowd, and several women and children were hurt. Near Independence, Kan., two men in charge of a steam threshing machine were killed by the fall of a bridge under their machine.

Said to be a Good Pumper.

The pretty little romance about "A Woman at the Throttle," on the Cairo & Kanawha Valley Railroad, in West Virginia, proves to have a slight basis of fact. Miss Ida Hewett, the daughter, not of a "heavy stockholder," but of a farmer, tends the engine at a pumping station. It is no doubt true that, as the story states, she has no mean ability as a machinist; but on the other hand it is only fair to say that the engine of a pump house is seldom mean enough to make very pressing demands upon the mechanical skill of its custodian. Miss Ida "makes her daily run with as much regularity as the most veteran engineer," but the run is only from her dwelling to the pump house.

A Portable Railroad for Africa.

A brief description is given in the *Verkehrszeitung* of the narrow gauge portable railroad which has been designed for transporting the steamer of the German African agent, Major Wissmann, from its landing place on the coast of Africa to Lake Victoria. Man power will be used to propel the train, and it is thought that 1,000 men will suffice to carry out the undertaking, whereas the originally contemplated method of transporting the steamers in sections by carriers would probably have required not less five times that number. It is stated that from five to six months will elapse before the steamer reaches its destination. The track length of the railroad is only about 820 ft., while the length of the train which will carry the sections of the vessel, provisions and stores, etc., will be about 328 ft. The track sections consist each of two rails and a crosstie at one end. At the other end each rail is fitted with a hook, by which it is fastened to the preceding section already laid down. Each track section weights about 62 lbs., and can, therefore, be easily carried by one man. The practical operation of the road of course presents no new features, the rear sections of track being successively carried to the front end as the train moves along. It is not expected that any difficulty will be experienced from grades on the proposed route, and as regards streams to be crossed there are none of any appreciable

width. The railroad was recently shipped to its destination by the German firm R. Dolberg, of Rostock.

New Stations and Shops.

The Wheeling & Lake Erie has awarded the contract for building the new car shops in Ironville, O., about one-quarter of a mile east of the City of Toledo, to Alexander Bentley for about $30,000. The structure will be principally of brick and stone, and will include a car shop 90 ×146 ft., a wood-working shop 65×141 ft., and a boiler-house 20×40 ft.

The Delaware, Lackawanna & Western is building at its shops at Utica, N. Y., two new passenger locomotives, which will soon be completed.

Mexican Steamship Subsidies.

The Mexican Government has decided not to renew the subsidy that has been paid to the Spanish Trans Atlantique line of steamers, which expires on January next; but will continue the subsidy it has been paying to the Ward line of New York.

The Chief Railroad Commissioner of New South Wales.

The projected visit of Mr. Eddy to Europe affords an opportunity for having light thrown on a moot point in the administration of railways. If there is any public officer that deserves the confidence of the country it is our Chief Commissioner. When all around us we find the public in revolt against the management of railways, we have the pleasant contrast in New South Wales of a railway system that gives satisfaction, not only in financial results, but in the constant readiness that is shown to do anything that promises to increase the convenience of the people. That this results in great measure from the personality at the head of the system is freely admitted.—*Sydney Morning Herald.*

The New Chicago Stock Yards Company.

The following officers of the National Stock Yards Co. have been elected: Henry Botsford, President; C. P. Libby, First Vice-President; Thomas E. Wells, Second Vice President; John C. Hately, Secretary, and J. B. Robertson, Treasurer; Elmer Washburn, Superintendent. The Secretary says that the 15 small packers will go to Stickney as soon as the land is transferred. The Calumet Terminal railroad will build a line out to Elsdon, on the Grand Trunk. The Transfer Company has begun operations looking to the completion and extension of its plant. The company has also commenced the purchase of right of way for its connection with the Atchison, Topeka & Santa Fe.

Turning of the Tide.

On Oct. 1 the engines of the Big Four system will be named as well as numbered. Names of States will first be used, then names of cities of 100,000 inhabitants and upward, followed by those of rivers and mountain ranges of this country.—*Western paper.*

For many years now the hearts of all poetic railroad men have been grieved to see the gradual death of every sentimental feature in the mechanical department. Names have been taken off from engines, the painters have been forbidden to use gilt or anything gaudy, neat-appearing smoke stacks are swapped off for sections of second-hand stove pipe, and finally the permissible amount of draping on the occasion of a runner's death has been curtailed; in fact, everything characterized by soulfulness in the least degree has been sat down upon with a relentlessness that would be expected only from a pile driver. But now the æsthetic soul may take courage. If the above quoted item will only stay true until it reaches the reader, it can be used not only to boom the gossip column of the local papers, but will also start a fresh discussion about the census.

LOCOMOTIVE BUILDING.

The Canadian Pacific expects to have soon in service the first lot of 25 locomotives for which orders were recently given. In addition to these engines being constructed in outside shops, the company is building 25 engines in its own shops.

CAR BUILDING.

Lake Shore & Michigan Southern is in the market for 1,000 box cars and 800 cars of miscellaneous design.

The Wabash road filed a chattel mortgage for $165,000 at Quincy, Ill., Sept. 12, in favor of the Haskell & Barker Car Co. for 250 30-ton freight cars now being manufactured.

The orders for the 2,000 box cars of the Chicago, Burlington & Quincy are understood to have gone to the Missouri Car & Foundry Co., of St. Louis, and the new Madison Car Works, of Madison, Ill.

The Montreal shops of the Canadian Pacific are working on large orders for passenger and freight cars. Altogether 1,000 freight cars are now being built for the road, in the company's shops and by private car companies.

The St. Charles Car Co. has just closed a coatract with the Chicago, Burlington & Quincy to build 30 handsome passenger cars—six cars to be built each month until the order is completed. The cars will be finished in mahogany and have Scarritt high back seats. The car company has an order from the Centralia & Chester for a complete train to consist of baggage, mail and express cars, smoking car and one first-class passenger car. The latter car is to have an inside finish of mahogany, and will have separate toilet rooms, the Scarritt high back car seat and the Baker heater.

BRIDGE BUILDING.

Benning's, D. C.—The following were the bids for the erection of the iron highway bridge across the Potomac River, near Washington, opened last week by the District of Columbia Commissioners: The Phœnix Bridge Co., $53,000; Ellery Colby, $48,000; Dean & Westbrook, $58,450; A. D. Neeld, $56,520; Nelson & Buchanan, $59,000; King Iron Bridge & Mfg. Co., $58,404; Berlin Iron Bridge Co., $69,570; Youngstown Bridge Co., $55,000; Groton Bridge & Mfg. Co., $53,700; Wallis Iron Works, $63,618. The bridge is to be constructed under the provisions of a special act of the last Congress, which appropriated $60,000 for the construction of a stone or iron bridge across the Eastern branch of the Potomac River at Benning road. The lowest bidders were the Youngstown Bridge Co., but on account of the burning of the shop, the King Iron Bridge Co. will probably be awarded the contract. The bridge is to be 500 ft. long, the roadway 24 ft. wide, and the two footwalks 15 ft. each.

Bismarck, N. D.—The Northern Pacific is said to be considering plans for a proposed bridge over the Yellow stone River at Bismarck. The site has been examined by Chief Engineer Kendrick of the Northern Pacific, and George S. Morison, of New York.

Bowmanville, Ont.—A new steel bridge is to be erected at King street, the estimated cost of which is $10,000. The bridge is to consist of two spans of 85 ft. each, 18 ft. roadway, with wing wall, riprap and cedar piling for the protection of the approaches. The foundations of the masonry are to be set on piles. The bridge proper will be 20 ft. above low water level.

Bucks County, Pa.—The County Commissioners have contracted with the Pittsburgh Bridge Co. for the erection of a $4,400 bridge over Swamp Creek, in Milford township. Another bridge will be built in Middletown township, near Helling's cross-roads.

Doddridge County, W. Va.—The stone work for the bridge over Nutter's Fork River, on the Doddridge County road, has been completed and the iron work is being erected.

Georgetown, Tex.—The county commissioners have awarded the Chicago Bridge & Iron Co. the contract for building 12 iron bridges in Williamson County, the total cost to be $45,500, all to be finished by April, 1892. When the six bridges are completed, including the two over the North and South Gabriel, at Georgetown, bonds to the amount of $16,000 will be issued in part payment, the remainder to be paid when all are finished.

Hastings, Minn.—The Clinton Bridge & Iron Co. has received a contract for building a new steel bridge across the Vermillion River at this place.

Lenape, Pa.—The wooden bridge over the Brandywine River in West Chester County at Lenape is being replaced by a new iron structure. The bridge will be used by the electric railroad, and will have a carriage-way and footwalk.

Louisville.—The Phœnix Bridge Co., of Phœnixville, Pa, has filed an attachment against the East End Improvement Co. for $201,336 for work on the new Louisville and Jeffersonville bridge. The East End Improvement Co. sublet the contract for building the bridge to the Phœnix Bridge Co. The latter has not been paid.

Memphis, Tenn.—The City Council has postponed the awards of the contract for building the Mill street bridge in Memphis. The bid of the Livermore Foundry of Memphis, $10,985, was the lowest for the iron superstructure. There was an irregularity in the bids for the masonry.

Moncton, N. B.—Brewer & Haines have commenced the erection of a new bridge at Moncton, and are constructing others in New Brunswick, at Hampton, Nashwaak and at Aroostook.

New York City.—Bids are asked on the large steel draw bridge over the Harlem River at 155th street. Tenders will be received up to Oct. 7. Specifications and estimates of quantities can be had from Mr. A. P. Boller, consulting engineer, 73 Broadway, or from the Department of Public Parks. The contract to be let includes the substructure and superstructure of the draw span and the span over the tracks of the New York Central Railroad. The award of the eastern approach will be postponed until next spring. The work to be let Oct. 7 is estimated to cost $850,000 and the cost of the eastern approach at $400,000. This bridge has been described in these columns. The draw span is 410-ft. centre to centre, and 67-ft. over the cornices. The four approach spans are about 320-ft. long. The weight of the draw span will be 2,419,000 lbs.; the turn table will weigh 750,000 lbs., and the fixed spans, 1,360,000 lbs.

Parkersburg, W. Va.—There has been litigation in Parkersburg for several years concerning the building of a bridge across the Little Kanawha River at or near George street. Some of the property owners have wanted it and others have opposed it. Last week the matter was settled by the County Court granting to the Parkersburg Bridge Co. the privilege to build a bridge at George street. The provisions under which the privilege is granted are that the work shall be commenced before next July, and that the city of Parkersburg shall have the privilege of buying the structure at appraised or agreed price at any time it may so desire. The little Kanawha River at that point is a little over 1,500 ft. wide. The company has expressed its intention to erect a steel bridge of three spans, the channel span to be about 500 ft.

Paterson, N. J.—Bids were received as follows for the construction of an iron bridge, consisting of one span of 78 ft., one of 70 ft., two of 53 ft. and one of 48 ft., with a roadway 20 ft. in width and two sidewalks of 5 ft. each: Smith Bridge Co., $14,900; King Iron Bridge & Mfg. Co., $12,972; Berlin Iron Bridge Co., $15,000; Variety Iron Works, $13,700; Pittsburgh Bridge Co., $13,400; Riverside Bridge Works, $12,813; Penn Bridge Co., $12,596; Passaic Rolling Mill Co., $11,891; Eugene B. Hedden, $14,100; Groton Bridge & Mfg. Co., $9,450; Dean & Westbrook, $10,500. The contract, including removal of the old bridge and the building of about 400 cu. yds. of new masonry, was awarded to Dean & Westbrook.

Philadelphia.—Bids for the erection of the Kensington avenue bridge were opened last week, but the award has not yet been made. J. H. Hathaway was the lowest bidder for the superstructure. He bid $44,385 for iron work, $43,966 if of steel. The highest bid was that of Sparks & Evans, $63,000 for iron and $61,800 for steel.

The Pennsylvania will soon erect three more bridges between Frankford and Holmesburg Junction, so as to entirely do away with grade crossings on those tracks.

Randolph County, W. Va.—The West Virginia Central & Pittsburgh railroad has contracted with the Youngstown Bridge Co. for the erection of a new steel bridge across Mills Creek, Randolph County. The new bridge is to take the place of an old wooden structure and will have a main span 200 ft. long and two short spans. The steel for the bridge has been delivered on the ground and the work of erection will commence as soon as new piers are built for the main span.

Trenton, N. J.—The New Jersey Steel & Iron Co., of Trenton, has been awarded the contract to erect an iron highway bridge 157 ft. long at Trenton. The contract price is $7,983, the lowest bid.

Washington, D. C.—The Pennsylvania has prepared plans for the construction of an iron span in the Long Bridge over the Washington channel of the Potomac River. It is proposed to build three stone piers, and the bottom of the river is now being examined for the foundations.

Wilmington, Del.—The Levy Court is examining sites for the proposed bridge over the Brandywine River north of Market street, in Wilmington. A bridge at Washington street would be 610 ft. long and 55 ft. high, and it is estimated would cost $50,000. One at Broom street would be 600 ft. long and 85 ft. high, and would cost $55,000.

Winnipeg, Man.—A new iron bridge will be commenced this winter between Winnipeg and St. Boniface.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In Iowa the Supreme Court rules that under the state code of Dakota, providing that the obligations of a common barrier may be limited by special contract, the carrier may by special contract, signed by the consignor, be released from liability except for negligence, and the liability may be limited to $5 for each hundred weight of goods.[1]

In Texas it is held by the Supreme Court that a carrier cannot limit its liability, in case of loss or injury to stock through its negligence, for the full value at the place of destination, by a contract to pay the value at the time and place of shipment.[2]

In Texas there was stamped on the face of a bill of lading the following words; "Twenty dollars per barrel valuation and owner's risk of leakage, caused by cracked or broken staves, worm-holes, or for any other cause, not the gross negligence of the company," and in the body of the bill of lading there was also the following provision: "It is further agreed that, in case of loss, . . . the amount of the loss or damage shall be computed at the value or cost of said goods or property at the place and time of shipment." The Supreme Court holds that these provisions amounted to a stipulation limiting the liability of the carrier for loss caused by negligence, and are therefore void, as against public policy.[3]

In Rhode Island the Supreme Court holds that under a general power to condemn land for a right of way, a railroad company cannot take land occupied by the main line and necessary side tracks of another railroad company, though the land was acquired by the latter company by purchase and not by the exercise of the power of eminent domain.[4]

In Illinois the Supreme Court rules that the jury may consider not only the value of the land taken, but also whether the land not taken is left in a worse shape for cultivation or pasturage, whether it is more dangerous for use, whether there is danger of fire from passing engines, and all other inconvenience the property may sustain in its use, for the future as well as the present.[5]

The Supreme Court of Minnesota decides, under the statute of 1878 providing that a railroad company "shall hereafter be liable for all damages sustained by any person in consequence of [its] failure or neglect" to fence its road, that a company will be liable for the diminution in the rental value of a farm through which it passes, caused by its neglect to fence, and that the statute applied to all railroads in the state, whether existing before or after the passage of the act.[6]

In Alabama the Supreme Court rules that in an action for killing cattle on the track, a charge that defendant is negligent in failing to use a locomotive headlight, such as is in use on the best equipped railroads, without regard to its actual utility or superiority as demonstrated by use, is defective.[7]

In Indiana the Supreme Court rules that where the owner of a horse carefully confines it in a well fenced inclosure, and without his knowledge or actual fault it escapes and wanders to a public railroad crossing, where it is negligently killed by a passing train, the presence of the horse on the crossing will not be imputed to its owner as contributory negligence, though there is no order of the county board permitting such an animal to run at large.[8]

In Minnesota the locomotive alleged to have started the fire which injured plaintiff's property, had a diamond stack. It appeared that for at least two years extension fronts had been in general use on railroads, and that all defendant's other engines had these. There was evidence that the extension front for preventing the escape of sparks was better than the diamond stack, and it was not contended that the extension fronts were not equally serviceable for the purposes of the company, or that it was not practicable to have used them exclusively. The Supreme Court affirms a verdict against the railroad.[9]

Injuries to Passengers, Employes and Strangers.

The Supreme Court of the United States decides that a landslide in a cut, which results from the loosening of the earth in its sides by a fall of rain which is not of unusual violence, is not such an occurrence as is embraced in the phrase "act of God." Also that a railroad which maintains a cut with sides in such a condition that a landslide occurs therein is guilty of negligence, though the immediate cause of the accident was vibration produced by a train passing through the cut.[10]

In Pennsylvania the plaintiff started to leave the car as soon as the train stopped at the station. When she reached the platform she found that the train was moving, and she fell off and was injured. The brakeman who should have been at the platform assisting passengers to alight had run forward and given the signal to start. The Supreme Court rules the company was guilty of negligence. It is proper to instruct the jury that, while it is negligence *per se* for a passenger to alight from a moving train, yet, if defendant did not stop its train at the station a sufficient time to enable plaintiff to alight with safety, and she left the car with reasonable expedition and care, and did not discover that the train was in motion until she came to the steps of the platform, and was descending them, then her position of danger was one occasioned by the negligence of defendant; and if the danger was so sudden that she had no time to deliberate and choose between the danger of remaining on and stepping off, and under all the circumstances she acted according to her best judgment, then she is free from fault.[11]

In New York it is held by the Supreme Court that when a railroad ticket agent wrongfully procures the arrest of a passenger on the ground of passing counterfeit money, the company is liable.[12]

In Georgia it is decided by the Supreme Court that a railroad which has employed an independent contractor to construct its road is not liable for the damages resulting from a nuisance created by such contractor, consisting of a pond on plaintiff's land, the result of failure to drain through an embankment, and the accumulation therein of filth from the camp of the contractor's workmen; the nuisance not being one necessarily incident to the construction of the road, and the railroad company having retained no control over the manner of constructing it.[13]

In Alabama the Supreme Court rules that a railroad cannot, by its contract of employment, exempt itself from liability for injuries that may be caused by its negligence.[14]

In Missouri the conductor of a freight train was ordered by the train dispatcher to take into his train some cars which were on a side track. He gave the numbers of the cars to his brakeman, and ordered him to get them out. The brakeman got on the brake-beam of the tender and the engine was backed on the side track. The brakeman turned toward the engine and gave a signal to back up, and as he did so the tender struck a flat car and he was caught between the tender and some iron rails which extended over the end of the flat car. It was a dark night. It was the custom of the company to carry cars loaded with timber and iron rails extending over the ends of the cars, and it was shown that rails and timbers loaded on cars would slip back and forth. The brakeman was experienced in yard work and on trains. The Supreme Court rules that there was no evidence of negligence either in leaving the car loaded as it was on the side track, or in failing to notify the brakeman that the car was there.[15]

In New York the Supreme Court rules that where a brakeman while attempting to couple an engine to a train of cars, is crushed by reason of the bumpers on the engine being so low as to pass under the bumpers on the car, and allow the engine to come in contact with the car, the road is liable.[16]

In Utah the Supreme Court rules that a workman in the repair shop is not a "fellow servant" of a switchman in the yard.[17]

The Supreme Court of Missouri decides that one employed by a railroad as yardmaster, having power to hire and discharge employés, and general charge of the company's business at a particular place, is not a fellow servant of a switchman also employed there, within the rule exempting the master from liability to one servant for the negligence of his fellow servant in the same line of work under a common employment.[18]

In New York it is held by the Supreme Court that a laborer and an engineer, in the employ of the same company on its railroad, are fellow-servants; and the former cannot recover from the company for personal injuries caused by the negligence of the latter while in such employment.[19]

In Missouri the Supreme Court rules that though the safety of the laborers on a work train requires that the engineer should give the customary signals when the train is about to start, and it is made a part of his duty to give the signals; his failure to do so is the negligence of a fellow-servant, and the railroad company is not liable for an injury resulting to a laborer on the train.[20]

In Alabama it is ruled that a trainman who has no functions to perform in keeping the road-way in repair is not presumed to have knowledge of a stone in a cut projecting over the roadway, when such has never been imparted to him.[21]

In Missouri it is held by the Supreme Court that the danger arising from the use by a yardmaster of a coupling consisting of a piece of brakebeam rod, partly bent, but not sufficiently to stay in place when the cars bump together, cannot be declared, as matter of law, one of the ordinary risks of the employment of a switchman injured in consequence thereof, and having no knowledge or notice of said facts.[22]

In Massachusetts it appeared that at the place of the accident trains and engines were very frequent; that there was no legal duty to blow the whistle or ring the bell; that deceased's employment was such as necessarily required him to look carefully for coming trains and engines. He was on the track when killed by an engine, and there was no evidence of what care he exercised. The Supreme Judicial Court holds that under the law of 1887, chapter 270, making it necessary for plaintiff, in an action against an employer for the wrongful killing of an employé, to prove that deceased was exercising due care when killed, a nonsuit was proper.[23]

In Alabama it is ruled by the Supreme Court that where there is evidence that, if an order of a conductor of a freight train to a brakeman to go on the roof of a car had been executed on the instant, the accident by which the brakemen was injured might not have occured, failure to so execute it is not negligence on the brakeman's part when he delayed only a moment or two to put on his overcoat and gloves, the weather being inclement.[24]

In Minnesota the plaintiff, while walking south along defendant's track in a city, was struck by a train going in the same direction. At the point where plaintiff got on the track he could only see to the north about 300 ft., but, although the distance from that point to the place of the accident was about a block and a half, plaintiff did not look back. Signals sounded at a distance of 150 ft. from him, and nearer, were not heard by him, and he admitted that, in looking at an engine on another track, he forgot about other engines. The Supreme Court holds that plaintiff was guilty of contributory negligence.[25]

In the same state the plaintiff's intestate, a child, about 10 years old, was caught between cars in defendant's gravity yard, one of which he and his companions had set in motion by releasing a securely fastened brake, and killed. The Supreme Court decides that, though such cars might be attractivs to boys as a means of amusement, defendant owed no other duty to plaintiff's intestate than to securely fasten the car by means of the brake, and could not be required to set a watch over the cars so fastened, or provide other means than the brake to prevent the cars from being set in motion, and, having discharged its duty in the premises, was not liable for intestate's injury.[26]

In Texas the Supreme Court rules that the fact that at the time of an accident at a crossing, the engine was in charge of a brakeman, whose duty did not include the management of the engine, does not relieve the company from liablity, where it appears that the fireman was on the engine while it was being moved by the brakeman.[27]

In Missouri the Supreme Court holds that a city ordinance limiting the speed of trains to six miles an hour is valid, and that running the train at a speed greater than allowed by the city ordinance being negligence *per se*, and it being manifest that the excessive speed was the direct cause of the injury, error in the charge as to other forms of negligence is immaterial.[28]

[1] Hazel v. Chicago, M. & St. P. R. R. Co., 48 N. W. Rep., 923.
[2] Taylor B. & H. R. Co. v. Montgomery, 16 S. W. Rep., 178.
[3] G., H. & S. A. Ry. Co. v. Ball, 16 S. W. Rep., 441.
[4] In re P. & W. R. Co., 21 Alt. Rep., 965.
[5] Chicago, P. & St. L. Ry. Co. v. Blume, 27 N. E. Rep., 601.
[6] C. M. & St. P. R. Co. v. Finch, 48 N. W. Rep., 915.
[7] A. G. S. R. Co. v. Moody, 9 South. Rep., 238.
[8] C. St. L. and P. R. Co. v. Nash., 27 N. E. Rep., 564.
[9] Hoy. v. C. M. & St. P. R. Co., 48 N. W. Rep., 1117.
[10] Sleeson v. V. M. R. C., 11 S. C. Rep., 859.
[11] Leggett v. W. N. Y. & P. R. Co., 21 Atl. Rep., 996.
[12] Mulligan v. N. Y. & R. B. R. Co., 14 N. Y. (Sup.), 456.
[13] Atlanta & F. R. Co. v. Kimberly, 13 S. E. Rep., 277.
[14] R. & D. R. Co. v. Jones, 9 South Rep., 276.
[15] Jackson v. M. Pac. Ry. Co., 16 S. W. Rep., 413.
[16] Donohue v Brooklyn City R. Co., 14 N. Y. S., 639.
[17] Pool v South Pac. R. Co., 26 Pac. Rep., 651.
[18] Taylor v M. Pac. Ry. Co., 16 S. W. Rep., 206.
[19] Mele v. D. & H. C. Co., 14 N. Y. S., 630.
[20] Higgins v. Mo. Pac. R. Co., 16 S. W. Rep., 409.
[21] Georgia Pac. Ry. v. Davis, 9 South Rep., 252.
[22] Taylor vs. M. Pac. Ry. Co., 16 S. W. Rep., 206.
[23] Shea vs. B. & M. R. R. Co., 27 N. E. Rep., 672.
[24] Georgia Pac. Ry. v. Davis, 9 South Rep., 252.
[25] Johnson v. Truesdale, 48 N. W. Rep., 1,136.
[26] Haesley v. Winona & St. P. R. Co., 47 N. W., 1,024.
[27] Dillingham v. Parker, 16 S. W. Rep., 335.
[28] Gratiot v. M. Pac. Ry. Co., 16 S. W. Rep., 384.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Milwaukee & St. Paul, semi-annual, $3.50 per share, payable Oct. 22.

Chicago, Rock Island & Pacific, quarterly, ½ per cent. payable Nov. 2.

Rio Grande Western, quarterly, 1¼ per cent., in cash, payable Nov. 1.

Sunbury & Lewiston, semi-annual, 4 per cent., payable Oct. 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston & Albany, annual, Boston, Mass., Sept. 23.

Chicago, Detroit & Canada Grand Trunk Junction, annual, Detroit, Mich., Sept. 30.

Fitchburg, annual, Boston, Mass., Sept. 30.

Lake Erie & Western, annual, Bloomington, Ill., Oct. 7.

Louisville & Nashville, annual, Louisville, Ky., Oct. 7.

Michigan Air Line, annual, Detroit, Mich., Sept. 30.

Montreal & Ottawa, special, Montreal, P. Que., Sept. 29.

New Jersey & New York Extension Railroad Company, special, 120 Broadway, New York City, Sept. 30, to vote upon a proposed increase of capital stock.

New York, Ontario & Western, annual, 18 Exchange Place, New York City, Sept. 30.

New York, Pennsylvania & Ohio, annual, 30 Euclid avenue, Cleveland, O., Oct. 14.

Old Colony, annual, Boston, Mass., Sept. 29.

St. Paul & Duluth, annual, St. Paul, Minn., Oct. 8.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Association of General Passenger and Ticket Agents* will hold its next annual convention at Old Point Comfort, Va., Sept. 15.

The *American Association of Railroad Clerks* will hold its second national convention at St. Louis, Mo., beginning Sept. 16.

The *International Brotherhood of Railway Conductors* will hold its third annual convention at Louisville, Ky., Sept. 21.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* will hold its next meeting at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in September.

The *Southern Railway Club* holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street New York

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* hold regular meetings on the third Tuesday in each month, as 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* hold regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of erch month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at iss rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers' of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in eacu month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N.Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

Engineers' Club of Cincinnati.

The regular monthly meeting of the club was held Aug. 20, with 24 members present. One new member was elected. Short papers by various members, on the following subjects, were read: Traveling cranes; The width of roadway in city streets; Settlement of embankments; Remarks on water feeding of stationary boilers; Railroad spirals; Proposed classification of engineers and State inspection of bridges.

There was considerable discussion and the last paper was referred to the Standing Committee on that subject.

Master Car Builders' Association.

The Executive Committee has arranged the following subjects, and committees to report upon them in June, 1892:

"Joint Inspection."—To prepare a supplementary set of interpretations and illustrations of the Rules of Interchange. *Committee:* A. M. Waitt, H. C. McCarty, F. D. Adams, Wm. Garstang, Joseph Townsend, J. T. Chamberlain, D. W. Hunter.

"Airbrake and Signal Instructions."—To review the instructions proposed at last convention. *Committee:* E. W. Grieves, R. D. Wade, J. L. Greatsinger.

"Cast Iron Wheels.—To investigate what improvements are being made in the manufacture of wheels, so as to secure greater uniformity in quality, in depth of chill, and in distribution of metal for proper balance. *Committee:* George W. West,, W. H. Thomas, John Player.

"Freight Car Truck Frames."—To report upon the relative advantages of swinging and rigid bolsters, and upon the Fox pressed steel truck as compared with the prevalent forms of freight car trucks. *Committee:* G. F. Wilson, W. S. Morris, W. F. Turreff.

"M. C. B. Automatic Couplar Standards and Limits."—To consider the standard measurements, and whether any additional or other measurements are desirable as standard, and to report upon proper limits of variation to be allowed from standard measurements. *Committee:* J. S. Lentz, C. A. Schroyer, J. M. Wallis.

"Steam Heating and Ventilation of Passenger Equipment Cars"—To report upon the general progress and the efficiency of different systems, and to present drawings for a proposed standard location of ends of train pipe, and a proposed standard connection in detail for a union between the hose and pipe, so that one style of coupling may be readily removed and another substituted in its place. *Committee:* J. N. Barr, J. C. Barber, W. H. Lewis, T. A. Bissell, J. W. Marden.

"Steel-tired Car Wheels."—To report upon relative merits of solid cast and wrought centres, and of plate centre bolted to hubs and tires. *Committee:* R. E. Marshall, J. O. Pattee, C. H. Cory.

"Wheel Guarantee."—To consider the communication from the Wheel Manufacturers' Association, read at last convention, and to report with recommendations. *Committee:* J. J. Hennessey, Thomas Sutherland.

"Steel Plate and Malleable Iron in Car Construction."—To recommend a standard for stake pockets, and a method in detail for attaching to cars. Also to recommend standards for centre plates, in detail, showing one for iron transoms and one for wooden transoms. Drawings and models to accompany the report. *Committee:* Wm. Forsyth, John Mackenzie, E. D. Bronner.

"Standards of the Association."—To consider the standards already adopted by the association, and recommend what measures are expedient to secure their general adoption and use. *Committee:* R. H. Soule, E. Chamberlain, Wm. McWood.

Metal for Brake Shoes.—*Committee:* G. W. Rhodes, E. B. Wall, Geo. Gibbs.

Master Car and Locomotive Painters' Association.

The 22d annual convention of this association was held in Washington, Sept. 9, 10 and 11, about 65 members being present.

The election of officers resulted as follows: President, J. A. Gohan of Huntington, Va., Chesapeake & Ohio; First Vice-President, William C. Quest of Pittsburgh, Pittsburg & Lake Erie; Second Vice-President, W. J. Orr, Rochester, N. Y., Buffalo, Rochester & Pittsburgh; Secretary and Treasurer, Robert McKeon of Kent, O.

The Conventions of the M. C. B. and M. M. Associations.

The Joint Committee of the Master Car Builders' and the Master Mechanics' associations have decided upon

Congress Hall, Saratoga Springs, for the next convention. The Master Car Builders will open Wednesday, June 15, and the Master Mechanics the following Monday.

Western Railroad Club.

The first fall meeting of this club was held this week and well attended. Mr. Rhodes presented a long and well prepared paper on the rules covering air brake practice as was announced in our last issue. The Johnstone compound locomotive was shown to the club at the Polk Street Station. The following officers were elected: P. H. Peck, President; W. D. Crosman, Secretary.

PERSONAL.

—Mr. C. C. Gale has been appointeed General Agent of the Chicago & Alton at Cleveland, O. Mr. Gale was formerly Superintendent of the Indianapolis and St. Louis Division of the Bee Line, but has not been in railroad service for several years.

—Mr. Charles Warner, a director of the Philadelphia, Wilmington & Baltimore and the Delaware Railroads, died at his home in Wilmington, Del., Sept. 8, at the age of 75. His death was due to blood poisoning resulting from injuries received in a runaway accident at Warm Springs, Va., on Aug. 6 last. Mr. Warner's father, William Warner, established a packet line between Wilmington and Philadelphia in 1794. At the age of 21, Mr. Warner succeeded his father in the firm, retiring 1868.

—John Hazelhurst Boneval Latrobe (born in Philadelphia, May 4, 1803, died at his home in Baltimore, Sept. 11, 1891, was the first son of Benjamin Henry Latrobe, who came to this country from Yorkshire, England, in 1796, and achieved a great reputation as architect and engineer. Among the most notable works of B. H. Latrobe may be mentioned the completion of the old capitol at Washington after his own designs, which were altered from those of his predecessors, and the construction of the first Schuylkill water-works for the city of Philadelphia. The second son, who bore the father's name, was for many years the chief engineer of the Baltimore & Ohio, and his son has been prominent as a bridge engineer, so that the name has been connected with engineering in a distinguished manner during three generations. Mr. J. H. B. Latrobe was equally conspicuous at home as a lawyer, citizen of public spirit and philanthropist. About the year 1828 he was engaged in procuring the right of way for the Baltimore & Ohio Railroad Company, and has ever since been of counsel for that corporation. He was prominently connected with the founding of the American Colonization Society, and with the establishment of the colony of Liberia, and has continued to be interested in the fortunes of that republic. He was the last survivor of that remarkable party of gentlemen who made one of the first railroad trips in history when Peter Cooper's locomotive (Aug. 28, 1830) drew the train from Baltimore to Ellicott City. He also enjoyed the distinction of having been counsel for the first electric telegraph company. Mr. Latrobe was a cadet at West Point at the time of his father's death, and by that event found himself compelled to resign that position; yet his interest in the military academy was such that he regularly attended the graduating exercises there, and did so this year. As a writer Mr. Latrobe was known at home, but not widely, although he wrote on many topics—law, biography, history and romance—and published privately a volume of verses. Three sons, one of whom has been thrice mayor of Baltimore, and two daughters survive him. The family of Latrobe has illuminated the annals of the city of Baltimore, and probably no more valuable citizen than the one whose career we have here described has ever been mentioned in them.

ELECTIONS AND APPOINTMENTS.

Atlantic & Pacific.—T. R. Gobel has been appointed General Superintendent of the Western Division to succeed D. B. Robinson, who recently resigned as General Manager. Mr. Gobel has for the last two years been Mr. Robinson's assistant.

Bristol (Vermont).—This company has been reorganized, and the following officers have been elected: President, P. W. Clement, Rutland, Vt.; Treasurer, H. G. Smith, Rutland, Vt., and Clerk, C. M. Wilds, Middlebury, Vt.

Brooklyn & Brighton Beach.—The directors re-elected the following officers at the last annual meeting: President, Gen. James Jourdan; Secretary and Treasurer, Col. E. L. Langford, and Superintendent, J. L. Morrow.

Calgary & Montana.—The annual meeting of the shareholders of this road was held at Calgary, Alberta, last week, when the following directors were elected: D. W. Davis, James Walker, J. G. Fits Gerald, I. S. Freeze, J. S. Lineham, W. F. Orr and Dr. Lafferty. The directors elected Mayor Walker President.

Connecticut River.—The annual meeting of the stockholders of the company was held at Springfield, Mass., Sept. 16. Directors were elected as follows: John P. Albin, Concord, N. H.; John H. Williams, Bellows Falls, Vt.; Oscar Edwards, Northampton, Mass.; Charles S. Sargent, Boston; William Whiting, Holyoke; E. F. Lane, Keene, N. H.; Frederick H. Harris, James A. Rumrill and John Mulligan, Springfield.

Denver, Lakewood & Golden.—At the recent annual meeting at Denver, Col., Sept. 8, the following Directors were elected: Charles C. Welch, William A. H. Loveland, W. F. R. Mills, J. C. Hodges, Jr., Samuel Newhouse, Hon. Caldwell Yeamen and Frank P. King. The directors elected officers as follows: President, Charles C. Welch: Vice President, Samuel Newhouse; General Manager, Frank P. King; Treasurer, J. C. Hodges, Jr.: Secretary, H. J. Hersey. J. W. Starkweather was formerly Vice President and General Manager. F. P. King, who succeeds him as General Manager, is a contractor and was formerly Superintendent of Construction of the Colorado Midland.

Dexter & Newport.—The annual meeting of the stockholders was recently held in Augusta, Me., and the following Board of Directors elected: Charles Shaw, James W. Bradbury, Albert F. Bradbury, George Fisher, William D. Sewall, Oscar Holway and Francis W. Hill. The board elected Charles Shaw, President; Albert F. Bradbury, Treasurer, and Josiah Crosby, Clerk.

Dexter & Piscataquis.—At the annual meeting of the company, recently held at Dover, Me., the following directors and officers were elected: J. B. Mayo and F. F. Dyer, Foxcroft; S. O. Brown, Dover; J. W. Bradbury and Treby Johnson, Augusta; George Fisher and William D. Sewall, Bath; D. R. Straw, Guilford, and F. W. Hill, Exeter. President, J. B. Mayo; Treasurer, Dr. E. A. Thompson, and Clerk, L. P. Evans.

Flint & Pere Marquette.—George G. Cook having resigned, E. F. Weld has been appointed Purchasing Agent, with headquarters at Saginaw, Mich.

Massawippi Valley.—The shareholders of this road held their annual meeting at Stanstead, Que., last week, the old Board of Directors being re-elected as follows: R. N. Hall and W. White, Sherbrooke, Que.; S. Foster and C. H. Kathan, Stanstead; A. B. Harris, New York; E. Raymond, W. K. Blodgett and Amos Barnes, Boston, and Oscar Edwards, Northampton, Mass. R. N. Hall was re-elected President.

Nashville, Chattanooga & St. Louis.—The present Board of dierctors was re-elected at the annual meeting at Nashville, Tenn., Sept. 8. The directors re-elected: Maj. J. W. Thomas, President; J. H. Ambrose, Treasurer; J. D. Maney, Comptroller, and R. C. Morris, Chief Engineer.

New York, Providence & Boston.—The annual meeting was held in Providence, R. I., Sept. 16. The following were elected directors: Samuel D. Babcock, Geo. M. Miller, New York; Nathan F. Dixon, Westerly, R. I.; Robert Knight, Providence: Henry C. Robinson, Hartford; George B. Wetmore, Newport, Benjamin N. Lapman, Providence; J. Walter Wood, South Orange; J. Pierpont Morgan, George G. Haven and J. L. Riker, New York. They organized as follows: President, Samuel D. Babcock; Vice-President, George Macculloch Miller; Secretary and Treasurer, A. R. Longley; General Manager, J. W. Miller, and Superintendent, J. B. Gardner.

St. Johnsbury & Lake Champlain.—The annual meeting of the road was held in St. Johnsbury, Vt., Sept. 10, and the old Board of Directors was re-elected as follows: C. E. A. Bartlett, Chelmsford, Mass.; George C. Lord, Newton, Mass.; Samuel C. Lawrence, Medford, Mass.; William T. Hart, Boston; C. S. Page, Hyde Park, Vt.; George W. Hendee, Morrisville, Vt.; Franklin Fairbanks, St. Johnsbury; H. E. Folsom, Lyndonville, Vt.; and S. C. Shutleff, Montpelier, Vt.

St. Lawrence & Adirondack.—The directors of this road and of the Herkimer, Newport & Poland Extension and Malone & St. Lawrence Railroads are as follows: J. K. Taylor, Charles R. Wager, Daniel B. Brown, Thomas P. Conneff, C. E. Taylor, Charles R. Lincoln, Frank G. Smith, George W. Van Loon and Morgan Wilson, all of New York City.

Portland & Rumford Falls.—Hugh J. Chisholm, Daniel F. Emery, Jr., George W. Russell, Lawrence Bradford and R. C. Bradford, of Portland, Me.; George C. Wing, of Auburn; George D. Bisbee, of Buckfield, and Waldo Pettengill, of Rumford, Me.; were elected as directors for the ensuing year at the annual meeting, which was recently held at Portland, Me.

Toledo, Peoria & Eastern.—At the annual meeting at Peoria, Ill., Sept. 15, officers were re-elected as follows: President, E. F. Leonard, Springfield, Ill.; Vice-President, E. N. Armstrong, Peoria; Secretary, E. D. Usner, Peoria.

RAILROAD CONSTRUCTION.
Incorporations, Surveys, etc.

Abingdon Coal & Iron.—Engineers are surveying for an extension of this road from Damascus, Va., into the iron lands in Shady Valley. Construction is now in progress between Abingdon and Damascus, Va., 15 miles.

Alloway & Quinton.—McManus & Riley, who have been awarded the contract for building this extension of the West Jersey Railroad from Alloway Station, on the Salem branch of that road, to Quinton, N. J., a distance of 4½ miles, have begun work with 60 men and 30 teams.

Atlantic Coast Line.—The grading on the Wilmington & Weldon line between Fayetteville and Rowland, N. C., which has been in progress several months, has been completed, and the convicts who have been working on the new branch have been removed. The new line is 42 miles in length and extends south from Fayetteville to near the South Carolina state line in Robeson County.

Austin & Northwestern.—Subscriptions amounting to about $17,000 have been secured in Austin, Tex., for a proposed extension to the Llano iron mines, about 25 miles west of Austin. It is understood that the extension will be built from Austin if a bonus of $100,000 is raised for the company and the right of way obtained. The city of Austin is asked to subscribe $35,000, the remaining two thirds of the amount having been secured at Llano by Frank Hamilton, A. P. Wooldridge, Colonel Miller and others.

Baltimore & Ohio.—The work on the extension to connect with the Virginia Midland road at Fairfax Station, Va., has commenced on the Maryland side. The surveys for this connection were made some time ago, but active work has been delayed. The road extends from Knowles Station, on the Metropolitan Branch, in Montgomery County, to the Potomac River about the Chain Bridge, in the District of Columbia. The river will be bridged at this point. Reaching Virginia the road will follow Pimmet Run to Langley, and thence on to Fairfax Station. When completed it will effect a Southern connection for the road through the Richmond and Danville system.

Bellingham Bay & British Columbia.—New bonds to the amount of $60,000 have just been issued by the company to complete the construction of the road between Bellingham Bay and the connection with the Canadian Pacific north of Blaine, Wash.

Brandon & Southwest.—D. H. Purdee, of Winnipeg, Man., the President of this company, states that the Dominion government has just approved the location and plans of the road for the section between Deloraine, south of Brandon, to the eastern slope of the Turtle Mountains, near the international boundary line. It is expected to complete the road this fall as far as the coal lands owned by the company in the Turtle Mountains.

Buffalo & Geneva.—Mr. Paul S. King, the Chief Engineer of this road, gives the following account of the progress of the extension: "We expect to have the road open for business by August next. All of the grading and masonry will be finished this month. Already we have 11 iron bridges built, and all of them will be finished by Oct. 15. We have laid 55 miles of the 105 miles of single track, and with the start we have we expect to finish all of the track laying on the first track by Nov. 15. The second track will be finished quickly after the first track is laid. In fact all of the light work is completed, and all of the grading remaining to be done is at Breakneck and Cramer, and it is rapidly progressing there. Within the next 10 days we intend to locate the stations. The eastern terminus of the Buffalo end of the road has not yet been settled upon, but it will be at a point west of Geneva. We have made unusual progress in our work this year. The summer has been favorable to out side work, although we were greatly delayed in our work during the early spring. If we have an open fall we will be able to push our work very rapidly."

Calgary & Edmonton.—The grading on the MacLeod extension is reported to be finished for the first 50 miles. The last 40 or 50 miles to MacLeod will probably be graded this fall. It has not been yet decided to lay the rails all that distance this year. The tracklaying has reached Pine Creek bridge.

California & Nevada.—The extension from Orinda Park north of Oakland, Cal., which is being built standard gauge, is now in operation as far as Maple Grove, a few miles east of Walnut Creek, in Contra Costa County, which is to be the present eastern terminus of the line. Surveys have been made as far as Bodie, near the Nevada State line, but it is not expected that much work will be done this season on the line beyond Walnut Creek.

Canadian Pacific.—The tracklaying will probably be commenced in ten days on the extension of the Souris line through Southwestern Manitoba to the coal fields near the Souris River in Southeastern Assiniboia. At present about 47 miles of the grading has been completed this year of the 70 miles of road from the end of grade beyond Melita, Man, which was placed under contract in the spring. The contractors expect to complete the balance of the distance to the Souris River at the rate of about a mile a day.

Tracklaying has been completed on the extension of the Glenboro branch from Methven to Nesbitt, Man., six miles.

Chattanooga Union.—It is reported that the East Tennessee, Virginia & Georgia secured control this week of a majority of the capital stock of this company, which operates a belt line at Chattanooga, Tenn., having a mileage of 45 miles. The belt line connects with all of the roads which reach Chattanooga and has a large passenger business in addition to the transfer of freight between the railroads and to the manufacturing establishments.

Chesapeake Beach.—The company, to extend from Washington to Chesapeake Beach, a point on Chesapeake Bay in Calvert County, Md., about 20 miles below Bay Ridge, in Anne Arundel County, has been incorporated by Edwin Warfield, Frederick H. Smith, William C. Codd, of Baltimore; James L. Barbour, Benjamin F. Karns, John G. Slater, of Washington, and Barnes Compton, of Prince George's County. The capital stock will be $1,000,000. The company has arranged with the Pennsylvania to use its terminal facilities in Washington and Baltimore. The new road will be commenced at a point on the Washington branch of the Baltimore & Potomac Railroad near Benning's Station, in the District of Columbia, and will extend through Prince George County to Marlboro, to the Patuxent River and through Calvert County to Chesapeake Beach, a distance of about 30 miles. The right of way has been secured and the line surveyed, and operations are expected to begin as soon as a sufficient amount of subscriptions are received to effect an organization.

Chicago & Eastern Illinois.—Trains are now running on the new branch extending from Tuscola, Ill., southwest to Sullivan, a distance of about 22 miles. The St. Louis extension will be completed to Shelbyville in about two months, when it is expected that through trains from Chicago to St. Louis will be run in connection with the Cleveland, Cincinnati, Chicago & St Louis.

Chicago, Fort Madison & Des Moines.—The first passenger train over the new standard gauge track was run Sept. 11 from Fort Madison to Birmingham and Collett, Ia., a distance of 45 miles. The road is to be extended toward Des Moines, and it is reported that about 22 miles of the grading has been completed beyond the old terminus to Ottumwa, Ia.

Chicago, Lake Michigan & Eastern.—Incorporated in Michigan to build a road from St. Joseph, Berrien County, southeast through the counties of Berrien, Cass and St. Joseph to the state line. The stockholders are: Peter English, Benton Harbor, Mich.; A. L. Lundgren and R. P. Van Dusen, Chicago; Warren Ballangee and J. C. Donohue, St. Joseph; J. P. Tresher, M. J. Lamport, John Bell and P. English, Benton Harbor. The capital stock is $500,000.

Denver, Lakewood & Golden.—The track on this road was laid into Golden, Col., last week, and the company expects to open the line for freight and passenger traffic in a few days. The length of the road is about 13 miles, and only work remaining to be completed is the ballasting of two miles.

Duluth, Mesaba & Northern.—A new survey has been completed by C. H. Martz to the property of the Mountain Iron Co. north of Duluth. The new route begins on the St. Louis River at a point near the mouth of the Artichoke River and west of the Cloquet River, extending thence directly north to the mine. The grades are very light, and for 30 miles the route is on a tangent and nearly level.

Fast Shore Terminal.—A change of ownership in this company is understood to have taken place recently, Messrs. Evans and McDonald, of New York, the builders, retiring, and being succeeded by Morris K. Jesup and the New York creditors. The company owns a terminal railroad in Charleston, S. C., along the water front, and a number of docks and cotton warehouses. The change of management may result in the extension of the road south from the company's docks and property between Queen and Broad streets to the southern wharf.

Flint & Pere Marquette.—The work of laying the Belt track on Water street north from Thirtieth street at Bay City, Mich., is progressing. The Michigan Central track was crossed this week.

Great Northern.—The tracklaying has been about half completed on a branch from Alton, N. Dak., north of Fargo, to Halstad, just east of the Minnesota State line. The line is about seven miles long through a level prairie country and the only important work on the line is a drawbridge over the Red River near Halstad.

The extension of the St. Hilaire branch south to Red Lake Falls, Minn., is now being graded under the direction of Col. William Crooks, of St. Paul. The line to Red Lake Falls is about 8½ miles long. The final surveys have not been quite completed but are now under way. The survey will probably be continued south to Dugdale in Polk County. There will be two heavy bridges over Red Lake River on the line now under construction.

The branch to the mines in the Little Belt Mountains has just been opened for freight traffic this week to Barker, Mont., about 11 miles from Monarch on the south side of the Missouri River near Great Falls. The branch is about 12 miles long.

President Hill says that the route of the Pacific extension has not been decided beyond Chatteroy northeast of Spokane, Wash. "We have run several lines beyond there, but there are some difficult questions to settle. It is a difficult matter to get down to and up from the Columbia River with easy grades. The route by which we cross the Cascades is nearly settled, but we have not decided on the pass. I can tell you it won't be the Skagit; I think it will be south of that."

Great Northwest Central.—A writ has been issued in Toronto on behalf of the railroad company against Mr. Alphonse Charlebois, of Montreal, the contractor, for $500,000, for damages for non-completion of contract, failure to transfer the first 50 miles of the company's line westward from Brandon and for the amount required to complete the same.

Herkimer, Newport & Poland Extension.—This company has been incorporated in New York with a capital stock of $500,000 to operate a line from the point of intersection with the Herkimer, Newport & Poland Narrow Gauge Railroad, at or near the village of Poland, in Herkimer County, northerly to Remsen, Oneida County, with a branch running from the main line at Prospect, Oneida County, to or near the village or town of Northwood, Herkimer County. The total length of the road will be 20 miles.

Kansas City, Watkins & Gulf.—The track has been laid north of Lake Charles, La., for a distance of 54 miles, of which about 30 miles has been laid this year. This leaves 40 miles of track to be laid to complete the road to Alexandria, much of which has been graded. Kennedy & Stone, who have the contract for laying the rails, have suspended work and removed their force to work on another road. All construction work is now entirely suspended, but the officers state that the grading will be resumed at Alexandria this month. The Prosser-Ware Construction Co., which has the contract for 23 miles south of Alexandria, has not graded any road for several weeks, on account of trouble with the laborers. The contract will probably be annulled and the work proceeded with under direct charge of the railroad engineers.

La Salle and Bureau County Belt.—The right of way is being secured for this line, which has been located from La Salle through Bureau County, Ill. The road will be about ten miles in length. It is intended as a connection to transfer freight to the Chicago, Burlington & Quincy and the Chicago & Northwestern roads, the junction points being directly west of La Salle, near the Bureau County line. A belt line is proposed at La Salle, connecting with the Illinois Central, but not with the Chicago, Rock Island & Pacific. The road, when completed, will open up considerable ground for sites for manufacturing industries.

Macon & Atlantic.—The grading is reported completed east of Bruton, the terminus of the old grade, to within a few miles of Guyton, on the Central of Georgia, north of Savannah. The grade from Macon to Bruton has been repaired, and the bridges and trestles erected. The track has been laid since 1890 for about 13 miles east of Macon, and as soon as a bridge east of Bruton is finished it is expected that the contractors will begin to lay the track, completing about a mile and a quarter each day through October. The officers of the company state that any further delay in the construction of this part of the line is unlikely, but it is reported that the payments on the bonds subscribed are over due.

Malone & St. Lawrence.—Last week this company filed articles of incorporation with the Secretary of State at Albany, N. Y., for the purpose of building a railroad from a point at or near the village of Malone, N. Y., north to Burke, Franklin County, a distance of about 12 miles. The capital stock is $24,000.

Manitoba & Northwestern.—Engineers are surveying in the vicinity of Carrot River and along Stony Creek to the Birch Hills. This is for the proposed extension beyond Yorkton, which it is reported will be built toward Prince Albert.

Mexican International.—W. T. Robertson, of the City of Mexico, is reported to be transferring his contractor's outfit from the line of the Monterey & Mexican Gulf to Torrlon, the southern terminus of this road. It is stated that he will begin the grading this month on the proposed extension, which has been surveyed south a distance of 60 miles to Durango.

Mexican Northern Pacific.—This is an English corporation, organized to build a system of railroads through the northwestern states of Mexico. Among the directors are Lord Monkswell, Sir Augustus Adderly, Sir Phillip Cunliffe Owen and Thomas Sutherst, barrister, of London. The latter will probably be the president of the company. The representative of the company in America is Mr. William H. Davis. The line will run from Deming, N. M., southwardly to Guerrero: thence westward over the Sierra Madre to Fuerte, Topolobampo and Guaymas, with branches to Chihuahua and the Sonora coal fields. It is designed to open up a vast tract of fine timber now inaccessible in the heart of the mountains; to develop the richest mining country in Mexico, and to open a market for the agricultural valleys along the eastern slope of the Sierra Madre and along the western coast. The length of the line will be approximately 1,200 miles, and the company proposes to push the construction as rapidly as possible. The surveys and topographical maps of the route are all prepared. The contract for the construction has been let to Geo. M. Huss, 456 The Rookery, Chicago. Nearly 100 miles of the line is graded and ready for the rails, which will probably be furnished by English mills. The character of the work is generally light, though there is some very heavy and difficult work in crossing the main range of the mountains.

Various reports have been given out recently concerning the connection of John W. Young and the Mormons with this project. Mr. Young has been endeavoring to promote the interests of the Mormon colonies now settled in Northern Mexico, and has had some connection with the railroad in so doing, but most of the reports in the newspapers are erroneous.

Mexican Pacific.—This company, which is building a line from Tonala in the State of Chiapas to Frontera in Tabasco, has received from the Mexican Government $2,670,000 in six per cent. bonds on account of subsidy earned on the last 30 kilometers of road constructed on the Pacific end the line, where there now 50 kilometers in operation. Construction is going on toward the interior of Chiapas, and will soon commence on the Tabasco end, near Frontera, the plans of the location having been approved by the government.

Mexican Roads.—F. A. DaCosta, of Eagle Pass, has recently received the concession for the construction of a narrow gauge road in Mexico, about 43 miles long, from Sierra Mojada to salt deposits at Laguna Jaco, on the borders of the States of Coahuila and Chihuahua.

Mexican Southern.—Col. L. L. Lamar, one of the subcontractors for the masonry on the section between Tecomavaca and Oaxaco, Mex., a distance of 90 miles, states that the largest force now working on the grading is at the Tomellin cañon, the most difficult part of the route. The work includes a large amount of heavy cutting and bridging over the cañons. About 3,500 men are working at this point under Scott Bros., M. Sullivan, Maylan Bros., and other contractors. The road is now in regular operation to Tecomavaca from Pueblo, and trains will probably be running on the entire line to Oaxaca in 14 months. Charles Thornton is the principal contractor, and J. P. Clow, his Chief Engineer.

Mexican Valley.—This line has been extended to Tizapan, seven kilometres beyond San Angel, to which trains are running regularly from the City of Mexico.

Missouri Pacific.—The branch of the Omaha Southern which was completed in the spring from Union north to Plattsmouth, Neb, a distance of 15 miles, has just been opened for traffic.

Monterey & Mexican Gulf.—An agreement has been made between the Mexican National and the Monterey & Mexican Gulf road whereby the latter gains access to the City of Mexico over the former's lines, thus making direct shipments possible from Tampico.

Morris County.—A branch of the road, about half a mile in length, is being built from the connection with the Delaware, Lackawanna & Western at Morris County Junction, N. J., to the United States Government works at Piccatinny, N. Y. A force of men has just begun work on the grading.

Nashville & Knoxville.—R. J. Moscrip, Division Engineer of this road, gives the following data regarding the status of work on the Cookeville extension: The line has been located from Cookeville, Tenn., east to Standing Rock, a distance of 18 miles. The King Bros. Const. Co. has the contract for 10 miles of grading and has about three miles finished, and will commence laying track about Oct. 1. Five miles will be light scraper work, and the balance heavy rock work, ascending Cumberland Mountain. Maximum grades are 100 ft. to the mile, and the maximum curvature is nine degrees.

New Roads.—Surveys are running a preliminary line from Evergreen, Lee County, southeast through Columbus, Wharton and Brazoria to Velasco, Tex., about 125 miles. Mr. Hindman, the engineer in charge, expects to reach Velasco in about six weeks.

L. J. Kopke, who is making the reconnoisance for the proposed road between Sabine Pass and Marshall, Tex., is now surveying near Shelbyville. The surveyors began near Jasper last month and have run the line for nearly 75 miles. The line will be continued through Center and Teneha, and will then be only a few miles south of Marshall.

New York Central & Hudson River.—The improvements planned for the branch between Tonawanda and Batavia, in preparation of a heavy coal traffic which will be run over the line when the extension of the Lehigh Valley from Geneva is completed to Batavia, will soon be begun. Some of the westbound traffic of the Lehigh Valley will be delivered at Batavia to the New York Central to be carried over this line, under an agreement between the two companies which was made last spring, soon after the lease of the Rome, Watertown & Ogdensburg. The latter road and the Lehigh Valley had each a half interest in the proposed Buffalo, Thousand Islands & Portland between Suspension Bridge and Buffalo. Rather than bear part of the expense of building a line which would parallel its own track, the New York Central allows the Lehigh Valley to use the Batavia and Tonawanda branch. The repairs to be made to the branch will be principally renewals and the strengthening of bridges. It is proposed to replace about 40 small spans of open stringer culverts and drains with cast iron drain pipes or solid floor bridge spans. The rest of the work will consist of replacing timber abutments and piers with stone masonry, general repairs of all the existing masonry, and the entire renewal of all bridge structures requiring it, and strengthening all others.

Northeastern Elevated.—The ordinance granted by the Philadelphia city council to this company in June provided that the company must begin the construction of its elevated road through Philadelphia by October. President Esler states that most of the $3,000,000 required to complete the road to Frankford has been subscribed, and the company expects to begin the erection of the road next month.

Ohio & Virginia.—The company was incorporated last week in West Virginia. It is proposed to build the road from Point Pleasant to Hamlin, through Lincoln, Boone and Logan counties, thence to the state line. The principal office is to be at Charleston.

Philadelphia, Wilmington & Baltimore.—Surveys are being made by engineers of this company for a new branch to Ocean City, Md. The branch will be about six miles long and will begin at Showell, on the line of the Delaware, Maryland & Virginia road above Berlin, crossing Synepuxent Bay north of the present railroad bridge and will be a cut-off saving several miles to the beach from Wilmington and Philadelphia.

Pittsburgh, Cincinnati, Chicago & St. Louis.—Renewed efforts are being made to secure the right of way for the short branch from New Cumberland, W. Va., toward East Liverpool, O., which was begun early in the spring. It is now proposed to build the line to Rock Springs, W. Va., on the Ohio River, opposite East Liverpool, but no construction work has yet been done.

Port Angeles & Southern.—The officers stated last week that arrangements had been made to secure the money to complete the road between Port Angeles, Wash., and the connection with the Port Townsend Southern. New preliminary surveys are being made to Port Discovery, which will be reached in six weeks. The grading will probably be resumed soon. The local bonuses voted to the company fall short by $100,000 of the amount asked. The road will be 25 miles long, and will extend from Port Angeles along the water front to Morse's Creek, and from thence, in a line as direct as possible, to Sequim Bay. There a swing bridge will be built, and the road will continue on to Port Discovery, where it will connect with the Port Townsend Southern. J. H. Smith & Co., of Portland, Or., and Smith Bros., of Seattle, are the contractors. C. E. Mallette, of Port Angeles, is General Manager.

Portland & Southern.—Two parties of engineers are in the field near Portland, Or. It is believed that the line will be run first to Marquam, in Clackamas County, a distance of 35 miles, and thence through a pass in the Cascade Mountains near Eagle Creek. The company was recently incorporated in Oregon by Mayor W. S. Mason, Frank Sperling, C. C. Clark, M. Meyer and John L. Ayer.

Potomac Valley.—The contractors, Ryan & Mc Donald, of Baltimore, will commence very soon to lay the track on this extension of the Western Maryland. The Metropolitan Trust Co., of Baltimore, has been made the Trustee of the $2,000,000 of bonds recently issued by the company for the construction of the road between Williamsport, Md., and Cherry Run, W. Va. The road will be used as a link to connect the Western Maryland, the Baltimore & Ohio and Philadelphia & Reading roads, and to enable them to interchange coal and coke traffic between the East and the West. The grading of the line is about completed on the 14 miles being constructed.

Quincy, Keokuk & Chicago.—The engineers of this company have recently resumed the surveys along the east bank of the Mississippi River north of Quincy, Ill. A party is now working south of Hamilton, near Keokuk, through Warsaw toward Quincy.

St. Lawrence & Adirondack.—Amended articles o incorporation were filed at Albany, N. Y., last week, the route to be from Remson, N. Y., in a northerly direction through the counties of Oneida, Lewis, Herkimer, Hamilton, St. Lawrence, Essex and Franklin to Malone. Branch roads will also be built from the main line to Saranac, Franklin County, and to Cranberry Lake, St. Lawrence County. The road will be about 175 miles in length, with a capital stock of $3,500,000. This road, together with the Herkimer, Newport & Poland Extension and Malone & St. Lawrence Railroads, which are mentioned elsewhere in these columns, is practically a reorganization of the Adirondack & St. Lawrence, now under construction, and of which Dr. W. Seward Webb is President. The reorganization is for the purpose of taking advantage of recent changes in the general railroad laws of New York.

San Antonio & Aransas Pass.—The grading and track laying on the Waco extension north of Cameron has been suspended, the work having been enjoined by the district court of McLellan County in the suit brought by the contractors of the Gulf, Brazos Valley & Pacific road. The injunction will probably not delay the construction of the line between Cameron and Lott more than a few weeks. Instead of using the present grade, which is claimed by the Gulf, Brazos Valley & Pacific, a new grade may be built parallel to it.

Snohomish, Skykomish & Spokane.—King & Dickinson, of Tacoma, Wash., the contractors who are building this short road, have about two-thirds of the grading completed from the Snohomish end and are employing about 300 men on the balance of the work. No track has yet been laid, but this work will probably begin this month. The road now under construction is about 10 miles long and extends from Snohomish to Port Gardner, Wash., on Puget Sound. The line has been surveyed west of Snohomish to Galena, 42 miles. The grading on the line now being built is mostly bottom and light sidehill work. There is one Howe truss bridge with a draw span of 230 ft. and one of 196 ft. and a third span of 150 ft. There is also a trestle 600 ft. long and 65 ft. high. The maximum grades are 52.8 ft. per mile and the maximum curves are six degrees.

Southern Pacific.—This company is now surveying a road from Collis south to Fresno, Cal., a distance of about 14½ miles. Preliminary surveys for this same line were made two or three years ago.

Taylor, Bryan & Trinity.—A preliminary survey is to be begun in a few weeks under Major B. S. Walthen, formerly division engineer of the Missouri Pacific. Tke route to be surveyed will be about 125 miles long, extending from Taylor, easterly via Bryan to Trinity, Tex.

Temiscouata.—The grading on the St. Francis branch has been completed, and the rails have been laid to within half a mile of the terminus. The distance from Edmunston, N. B., to the terminus is 31 miles. There are now two trains engaged in ballasting. It is the intention of the company to have the road ready for passenger traffic about Oct. 15.

Terminal Company.—A company by this name has been formed at Cleveland, O., to operate the belt line now being built on the northwest and southeast sides of that city.

Texarkana & Fort Smith.—The grading is now in progress from Little River to Milkin, Ark., about five miles north, and the track will probably reach the latter point by Sept. 20. This will complete 33 miles of the line north of Texarkana, Tex. The next section to be built is the 10 miles between Milkin and Lockesburg, Ark. The line has been located to that point, and for some distance beyond, and the grading will probably be completed to the town this fall before work is suspended.

Texas, Louisiana & Eastern.—Kennedy & Stone, of Topeka, Kan., who have been working on the Kansas City, Watkins & Gulf, in Louisiana, have commenced grading on the extension of this road east of Conroy near Ironwood and toward the Trinity River. Their contract ends at the crossing of the Houston, East & West Texas, at Keno in Liberty County, above Cleveland. In addition to this contract of Kennedy & Stone, Clay & Young, of Clay, have nearly completed the grading on the first section east of Conroy, upon which they began work in July.

Tintic Range.—The tracklaying from Springville, on the Rio Grande Western, above Thistle, Utah, has been completed to Payson, on the Union Pacific, a distance of about 10 miles.

Trinity, Cameron & Western.—John M. Hefley, President of the road, informs a local newspaper that negotiations were pending with the Missouri, Kansas & Texas for that company to take the right of way and build the line from Trinity to Granger, Tex., and that probably the negotiations would be consummated within a few days.

Utah, Wyoming & Eastern.—The company has been incorporated in Wyoming to build an extension of the line recently incorporated in Utah. The road is to begin in the southern part of Uintah County, and extends in a northeasterly direction to Bear River, crossing the Union Pacific near Hilliard, to Green River, and along Big Sandy River through Sweetwater County, paralleling the Wyoming & Eastern to Long's Creek, thence to the Platte River, and to Fort Fetterman, Showell Creek, and Lost Springs in Converse County, and the eastern line of Wyoming. There will be a number of branches. The route is through extensive timber lands, and through the grazing and farming parts of Wyoming, as well as the mining districts. The incorporators are Alfred Thompson, of Salt Lake City, George W. Carleton, of Hilliard, Oliver D. Marx, of Almy, and Samuel T. Corn, of Evanston, Wyoming.

Velasco Terminal.—A force of about 100 teams is at work near Velasco, Tex., on the Gulf of Mexico, clearing the right of way and grading toward the Brazos River. Burket, Burns & Murphy, of Dallas, and Peters & Bervus are the contractors, and state that the grading will be finished by Nov. 1 on the 20 miles to the connection with the International & Great Northern, at Chenango, Tex. The new road will probably be operated as a branch of the latter line, although it is being built by an independent company.

Waterloo Junction.—Track has been laid for a distance of five miles north of Waterloo, Ont., on this branch of the Grand Trunk, which is being built at Elmira, Ont., a distance of 11 miles. The grading is progressing on the remaining six miles. A large bridge over the Conestoga is practically completed.

West Virginia & Pittsburgh.—The grading has been completed and 2¼ miles of track laid on the extension from Elkins, W. Va., easterly to Beverly, a distance of 7 miles, and 12 miles has been graded and track laid for a distance of 3½ miles on the extension from Elkins, northeast to Belington, 17 miles. There will be three iron bridges over the Valley River—248, 320 and 225 ft. long, respectively. About 400 men are now at work on both lines.

Williams Valley.—This company has been recently organized at Tower City, Pa., by H. C. Bresler and C. M. Kauffman, to build a short road between Tower City, Brookside and Williamstown, in Dauphin County, Pa., on the Northern Central. The surveys have been completed between Tower City and Brookside, the terminus of the Lebanon and Tremont branch of the Philadelphia & Reading. The town of Brookside is located in a mountainous part of Schuylkill County, Tower City being situated in the valley below. As soon as the charter is issued the grading will be commenced. C. J. Jameson, of Philadelphia, will probably build the line. H. C. Bresler is President, C. M. Kauffman is Secretary and William Elliott is Treasurer.

Worcester & Shrewsbury.—A company is being formed at Worcester, Mass., for the purpose of extending this road from Lake Shore, Mass., the present terminus, northeast to Shrewsbury, a distance of 3½ miles. This road was until lately operated by steam, but now the motive power is electricity.

GENERAL RAILROAD NEWS.

Allegheny Valley.—As a result of Judge Acheson's recent decision directing foreclosure under the income bonds, a plan for the reorganization of the company is being prepared. It seems to be expected that the present capital stock of $2,166,500, a large majority of which is owned by the Pennsylvania, will be retired. Of the $9,728,500 of income bonds, the Pennsylvania owns $5,510,000, and upon this holding the reorganization will be based. The prior liens and guarantees remain undisturbed.

Astoria & South Coast.—There is considerable doubt as to whether the reported purchase of this road by the Southern Pacific Co. is true. The prevailing opinion is that either the purchase was not made at all or if made, the purchase price was more than $54,000, as reported.

Baltimore & Ohio.—The monthly statement of business gives the following comparison of earnings for August, 1891 and 1890. The earnings of the system east and west of the Ohio River were: $2,352,589, an increase of $101,552; expenses, $1,491,256; increase, $58,597; net increase of revenue, $42,955. The earnings and expenses for the eleven months of the fiscal year 1890-91, compared with the same months of the fiscal year 1889-90, were: On all lines east of the Ohio River, $17,130,245; increase, $92,899; expenses, $11,305,119; decrease, $45,895; net increase of revenue, $138,794. On all lines west of the Ohio River: Earnings, $5,057,630; decrease, $94,269; expenses, $4,249,124, increase, $21,874; net decrease of revenue, $116,171. The summary of the entire system gives the earnings as $22,187,875; decrease, $1,398; expenses, $15,554,243; decrease, $24,021; net increase of revenue, $22,623.

Chesapeake & Ohio.—The following shows the earnings of the company for the month of July, 1891, compared with the same month of 1890:

	1891.	1890.	Increase.
Gross earnings	$769,750	$643,663	$126,087
Oper. expenses	562,629	438,883	123,746
Net earnings	$207,121	$204,780	$2,341

Chicago, Milwaukee & St. Paul.—The annual meeting was held in St. Paul, Sept. 16. The reports given to the press give the following figures: Gross earnings, $27,504,224; increase, $1,098,516; net earnings, $9,137,724; decrease, as compared with 1890, $94,886; balance above fixed charges, $2,234,680. Out of this balance a 3½ per cent. dividend was paid in April on the preferred stock, amounting to $767,756. The company owns and operates 5,721 miles of main track. This includes the Milwaukee & Northern, purchased during the year, and for which the St. Paul issued 61,583 shares of its common stock for 61,582½ shares of the capital stock of the Milwaukee & Northern. The net earnings of the latter road for the year were $619,802, from which a dividend of four per cent. was paid.

Delaware, Lackawanna & Western.—The figures covering the operations of the road for the year ended June 30, 1891, compared with the last fiscal year, are shown below:

	1891.	1890.	Increase.
Gross earnings	$8,169,403	$7,726,874	$442,539
Oper. expenses	4,032,587	3,775,911	256,646
Net earnings	$4,136,816	$3,950,933	$185,883
Fixed charges	2,304,247	2,233,549	70,698
Surplus	$1,832,569	$1,717,384	$115,185

Illinois Central.—The income from traffic for the two months ending Aug. 31, 1891 and 1890 (August, 1891, estimated), was as follows:

	1891.	1890.	Inc. or dec.
Miles operated	2,875	2 875	
Gross receipts for traffic	$3,007.311	$2,696.034	I. $311,277
Operation expen & taxes	2,327,643	1,988,453	I. 339,180
Net earnings	$679,668	$707,571	D. $27,903

The operation expenses include large outlays for repairing damages on the Dubuque & Sioux City road, caused by floods in the neighborhood of Cherokee and elsewhere in Iowa.

Kettle River.—The Minnesota Railroad Commissioners have passed a resolution requesting the Attorney-General to ask the Supreme Court to mandamus this company to appoint a receiver. The line is only a few miles long, extending from Sandstone to Sandstone Junction, and was built to connect the St. Paul & Duluth and the Eastern Minnesota roads. The Duluth road leased it to the Eastern Minnesota. Since May 17, 1890, the road has not been operated. The people along the road paid a heavy bonus to have the line constructed, and want it operated.

New York, New Haven & Hartford.—The operations of the company for the quarter ended June 30, 1891, compared with the corresponding period of the last fiscal year, are shown below:

	1891.	1895.	Inc. or dec.
Gross earnings	$2,835,838	$2,787,419	I. $48,419
Oper. expenses	2,012,797	2,092,653	D. 79,856
Net earnings	$823,041	$694,766	I. $128,275
Other income	28,730	33,377	D. 4,647
Total income	$851,771	$728,143	I. $123,628
Fixed charges	427,129	486,948	D. 56,819
Surplus	$424,642	$241,195	I, $183,497

New York, Providence & Boston.—The annual report, read at the meeting in Providence, R. I., Sept. 16, gives the total receipts as $3,091,321; operating expenses, $1,977,932; total expenses, $2,585,584; net earnings, $505,806.

Northern Pacific.—The approximate gross earnings of the company, including the Wisconsin Central, show a decrease for August of $113,630. The earnings in 1890 were $2,623,017, on 4,990 miles of road, and for 1891, $2,509,387, on 5,266 miles. The crops in North Dakota moved several weeks earlier last year than this year, which accounts for part of the decrease. The earnings so far in September are showing an increase over last year.

Texas Central.—The order of the court transferring this Texas road to the new company organized by the bondholders will probably be made in a few days. At the foreclosure sale at Waco, Tex., last April, the purchasing committee bid in the road for $750,000, of which $25,000 was to be in cash. All the terms of the sale have been carried out. The new management is in practical control. Charles Hamilton is Acting General Manager. The roadbed will be thoroughly repaired, new steel rails laid, new cross ties put in, and the line practically rebuilt between Whitney and Ross.

Texas Trunk.—Three receivers have been appointed for this Texas road so far this month. The sheriff also claims possession of most of the property on writs of attachment. No trains have been running for several weeks, the employé srefusing to work, claiming that their wages have not been fully paid for several months. S. H. Kneeland, of New York, has been the president. The condition of the road has been allowed to deteriorate until it became dangerous to operate it. The Attorney-General ordered repairs to be made and his order not being obeyed he began suit in November, 1889, for the forfeiture of the charter. This suit was decided in his favor this week by Judge Haines of the State District Court, at Waxahachie, John H. Gaston being appointed receiver. Last week Judge Pardee, of the United States Circuit Court for Louisiana, appointed as Receiver, Charles Dillingham, of Houston, Receiver of the Houston & Texas Central. A few days later Judge Burke, of the State Court at Dallas, appointed James Maroney Receiver. Dillingham then secured from United States Judge McCormick an order enjoining Maroney from assuming control, but Judge Burke ordered him to ignore it and retain control.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Sept. 16, 1891.

The decision of the arbitrators, Messrs. Murray, Shattuc and Donald, has been filed in the Atchison mileage book case, in which the decision of Chairman Finley is reversed. In November, 1890, the Rock Island purchased 80 odd mileage books of Atchison issue "on the market," claimed to be disturbing rates, and asked chairman Finley to require the Atchison to redeem them in accordance with a provision of the Western Passenger Association agreement. The Atchison submitted in defense that 14 of the books had been secured on forged orders, and that the balance were regularly issued as editorial mileage under advertising contracts, and the provisions of the tickets rendered them worthless in other hands than those of the persons whose names appeared on the contract on each book; that the company promptly bulletined all such tickets found in the hands of other than the parties issued to, thus taking all possible precautions to prevent improper use. Chairman Finley rendered a technical decision in which he construed the agreement literally and as requiring the redemption of the tickets in question. The question of whether the bulletining of a ticket was a bar to its redemption had already been decided by the association in the negative. The preliminary report of the arbitrators does not state the reasons for their finding, but simply says that they do not find that the Atchison acted contrary to the intent of the agreement. The question of the bulletining of a ticket being a bar to its redemption was also considered, and in a separate decision they decide that such bulletining is a bar to redemption.

The Central Traffic Association has adopted the following differentials less than the authorized all-rail rates from Milwaukee to be applied on traffic from that point across Lake Michigan to points in the association territory:

Class,	1	2	3	4	5	6
Cents,	6	5	4	2	2	2

These differentials are to be subject to revision if found to work unsatisfactorily. The question of eliminating the insurance clause in bills of lading via water routes has been referred to a special committee.

Lake rates remain firm, 3½ cents on wheat and 3 cents on corn being bid for tonnage and accepted quite generally. The elevators are being run night and day to dispose of the immense amount of grain passing through them. They ran all day Sunday last to prevent a blockade.

The special committee consisting of Chairmen Walker, Finley and Vining and General Passenger Agents White, Eustis and Thrall, met yesterday, and discussed a form of agreement which would bring the agreement of the Western Passenger Association into harmony with the agreement and by-laws of the Western Traffic Association, and possibly result in the merging of the former in the latter.

The Western Passenger Association lines have voted not to grant the request of the Eastern lines to run "home visitors' excursions" on Sept. 22.

The Chicago & Eastern Illinois and the Toledo, St. Louis & Kansas City have opened a new freight route between Chicago and St. Louis, via Cayuga, Ind. It will be known as the "Cayuga Route."

The Southern Despatch has inaugurated a through refrigerator car service for perishable freight between Chicago and Nashville, Atlanta, Memphis, Mobile and New Orleans.

The Southwestern Railway and Steamship Association has adopted a declaration of independence which says that the chairman in acting with any other association (the Western Traffic) acts as an individual. The Chicago *Tribune* makes this the occasion to assert that the Western Traffic Association is disrupted, but Chairman Walker says that there is absolutely no change in the status or relations of the associations. The resolution was proposed by a line not a member of the Western Traffic Association, whose officials desired to make it clear that the association, as a body, was not in the latter association; and it was shaped in a form not to interfere with the obligations of individual lines in their membership of the Western Traffic Association, or with the acting of Mr. Faithorn on the Board of Commissioners, which has continued as previously.

Traffic Notes.

It is stated that the Baltimore & Ohio Southwestern will withdraw from the Central Traffic Association October 1.

The August report of the Cleveland Car Service Association shows average detention of 1.66 days, including coal and coke. Detention is computed from the hour of arrival.

The South Dakota Railroad Commissioners have been making an extensive investigation at St. Paul to determine the basis of charges that wheat shipped from their State is fraudulently graded.

The Union Pacific has instituted a suit in the Circuit Court at Salem, Or., against the State Railroad Commissioners, asking that the court review the action of the Commissioners in ordering a reduction of freight rates on the road.

Rail and lake rates from Boston to St. Paul via Lake Superior have been reduced to the basis of 60 cents, first class, and the Fitchburg road followed this action last Monday by reducing the rail and lake rates from Boston to Chicago to 27, 24, 20, 14, 14, 14.

A Salt Lake City paper says that all through passenger trains of the Union Pacific between the East and Oregon are now run via Ogden, using the north and south line between that point and McCammon instead of going over the shorter line between Granger and McCammon.

A Kansas City dispatch states that the Chicago, Rock Island & Pacific has agreed to make flat rates on grain to Kansas City, which apparently means that the proportion west of the Missouri River on grain billed through to Chicago and Eastern points will be no smaller than the rate to Kansas City proper on similar shipments.

At Memphis on Wednesday last, United States District Judge Hammond dismissed the bill of the Little Rock & Memphis against the St. Louis, Iron Mountain & Southern and the East Tennessee, Virginia & Georgia. The plaintiff sought to compel the Iron Mountain to accept and the East Tennessee to keep on sale through tickets to and from points beyond Little Rock west and Memphis east. This is apparently the same case that was decided by the Interstate Commerce Commission two or three years ago and Judge Hammond bases his judgment on the same grounds set forth by that body.

A large export grain trade has been done at New Orleans the last few months, and it is said that this result came about without any special effort on the part of the city, exporters making contracts via New Orleans. All the railroads delivered large quantities of grain, and as there was only one elevator, of limited capacity, and a temporary lack of ships, there was at one time a blockade of over 600 cars. The only road having grain facilities is the Louisville, New Orleans & Texas. It is said the Illinois Central will build an elevator within a few months.

Eastbound Shipments.

The shipments of eastbound freight from Chicago by all the lines for the week ending Sept. 12 amounted to 60,191 tons, against 55,950 tons during the preceding week, an increase of 4,241 tons, and against 72,520 tons during the corresponding week of 1890, a decrease of 12,329 tons. The proportions carried by each road were:

	Wk. to Sept. 12.		Wk. to Sept. 5.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	10,151	16.9	9,192	16.4
Wabash	3,782	6.3	3,655	6.5
Lake Shore & Michigan South.	8,314	13.8	6,422	11.5
Pitts., Ft. Wayne & Chicago	6,321	10.5	5,549	9.9
Pitts., Cin., Chicago & St. L	7,895	13.1	5,788	10.4
Baltimore & Ohio	3,795	6.3	3,748	6.8
Chicago & Grand Trunk	4,623	7.7	5,585	9.9
New York, Chic. & St. Louis	7,131	11.8	7,227	12.9
Chicago & Erie	8,179	13.6	8,784	15.7
Total	60,191	100.0	55,950	100.0

Of the above shipments, 1,476 tons were flour, 23,477 tons grain, 2,212 tons millstuff, 4,463 tons cured meats, 8,664 tons dressed beef, 1,353 tons butter, 1,393 tons hides and 6,086 tons lumber. The three Vanderbilt lines carried 42.5 per cent., the two Pennsylvania lines 23.6 per cent. The lake lines carried 133,649 tons, against 102,127 tons during the preceding week, an increase of 31,522 tons.